

Trojan Storage: Happy Valley Project Narrative for Design Review

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Trojan Storage: Happy Valley

Summary

Project Location and Identification

The property is located on the north corner of the intersection of SE Glenco Road and SE 82nd Ave. in Happy Valley, Oregon. More specifically, the property is on tax lots 00100 and 00190, on map 12E29DD, on approximately 3.2 acres (total). The property is zoned CC - Corridor Commercial.

Proposal

This project proposes new construction of four self-storage buildings with associated parking, utilities and landscape.

Site Activity Statement

This project proposes new construction of three self-storage buildings, totaling approximately 129,104 SF. One of the proposed buildings will be single story and two will be two-story. The facility will include a leasing office and a caretaker residence/duplex.

The buildings access to the lessees of the units will be from 6 AM to 9 PM year-round. The leasing office will be open for business from 9 AM-6 PM, Monday-Saturday. The project anticipates employing 2 full-time managers and a part-time maintenance technician.

Two driveway accesses are proposed, both on SE Glenco Road. The western most of these will be an exit only for trash and emergency vehicles. There is an existing shared driveway curb cut on the NE corner of the site which will not be utilized by this project. Three vehicular gates control access within the facility, limiting public access to the parking and office area at the SE corner of the site.

The project proposes a total of 26 parking spaces including 2 handicap. (located by office entrance). Three loading berths and 13 bicycle spaces are also provided.

The trash and Recycling area is proposed within the building at the SW corner of Building B. Trash and recycling containers will be rolled out for pick up.

Applicable Standards

This narrative addresses the compliance of this project with the following applicable codes and standards found within the Clackamas County Zoning and Development Ordinance and the Clackamas County Comprehensive Plan.

ZDO Section 510 (CC, Corridor Commercial Zone)

ZDO Section 1005 - Site and Building Standards

ZDO Section 1006 - Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management and Erosion Control.

ZDO Section 1007 - Roads and Connectivity

ZDO Section 1009 - Landscaping

ZDO Section 1015 - Parking and Loading

ZDO Section 1021 - Refuse and Recycling Standards

ZDO Section 1102 - Design Review

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Chapter 10:

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**ZDO Section 510
(CC; Corridor Commercial Zone)**

510.02 Applicability

RESPONSE: The project property is zoned CC, therefore this criteria applies.

510.03 USES Permitted

RESPONSE: Per Table 510-1: Permitted Uses in the Urban Commercial and Mixed-Use Zoning Districts, Services, Commercial—Mini-Storage/Self-Storage Facilities are a permitted use in the CC Zone.

510.04 Dimensional Standards

Dimensional standards applicable in the urban commercial and mixed-use zoning districts are listed in Table 510-2, Dimensional Standards in the Urban Commercial and Mixed-Use Zoning Districts. Modifications to the standards of Table 510-2 are established by Sections 800, Special Use Requirements; 903, Setback Exceptions; 904, Height Exceptions; 1012, Lot Size and Density; 1107, Property Line Adjustments; and 1205, Variances. As used in Table 510-2, numbers in superscript correspond to the notes that follow Table 510-2.

TABLE 510-2; Dimensional Standards in the Urban Commercial and Mixed-Use Zoning Districts

- Minimum Lot Size: None
- Minimum Street Frontage: None
- Maximum Front Setback: 20-feet [6]
- Minimum Front Setback: 15-feet
- Minimum Rear Setback: 0-feet [12]
- Minimum Side Setback: 0-feet [16]
- Maximum Building Height: None
- Minimum Floor Area Ratio: None
- Maximum Building Floor Area per Use: None
- Minimum Density: None

Notes to Table 510-2

[6] The maximum front setback standard applies only if required by Subsection 1005.03(H). However, see Subsection 1005.03(E) for a related standard.

[12] If the rear lot line abuts a residential zoning district, the minimum shall be 15 feet plus one foot for each one-foot increase in building height over 35 feet. Height increments of less than one foot shall be rounded up to the nearest foot. For example, if the building height is 38.8 feet, the minimum setback shall be 19 feet.

[16] If the side lot line abuts a residential zoning district, the minimum side yard setback shall be 15 feet plus one foot for each one-foot increase in building height over 35 feet. Height increments of less than one foot shall be rounded up to the nearest foot. For example, if the building height is 38.8 feet, the minimum setback shall be 19 feet.

RESPONSE: ZDO setbacks refer to building structures only. As proposed, Building A is setback 15-feet (front yard setback) from the SE 82nd Ave right-of-way. (after dedication). Buildings C and B are separated from adjacent property lines by vehicular access areas, resulting is setbacks of approximately 58 and 34-feet.

ZDO Section 1005 Site and Building Design

1005.02 Applicability

Section 1005 applies to institutional, commercial, and industrial development; multifamily dwellings; and developments of more than one two- or three-family dwelling. Subsections 1005.04 (F) and 1005.12 also apply to attached single-family dwellings. Subsection 1005.12 also applies to developments of a single two- or three family dwelling.

RESPONSE: This section applies to the proposed project.

1005.03 General Site Design Standards

The following site design standards apply:

A. Where feasible, cluster buildings within single and adjacent developments for efficient sharing of walkways, on-site vehicular circulation, connections to adjoining sites, parking, loading, transit-related facilities, plazas, recreation areas, and similar amenities.

RESPONSE: Due to the use, circulation into the site from adjacent properties is limited and restricted to unit renters with fencing and gates. However, the office is located outside of the restricted area at the corner of SE Glencoe Rd. and SE 82nd Ave. A large entrance plaza with walkways that connect to the office, parking areas, loading area and Building A is also located in this corner of the site. Two bicycle parking areas are provided adjacent to the office and entrance to Building A. Circulation within this area offers ADA accessibility.

B. Where feasible, design the site so that so that the longest building elevations can be oriented within 20 degrees of true south in order to maximize the south-facing dimensions.

RESPONSE: Two of the three buildings are oriented toward the south.

D. A continuous, interconnected on-site walkway system meeting the following standards shall be provided.

1. Walkways shall directly connect each building public entrance accessible to the public to the nearest sidewalk or pedestrian pathway, and to all adjacent streets, including streets that dead-end at the development or to which the development is not oriented.

RESPONSE: A direct pedestrian/bike connection to the public entrances to Building A and Building B are accessible to both abutting rights-of-way. There are no public entrances to either Building C. Access to this buildings is restricted to the tenants. (storage unit renters).

2. Walkways shall connect each building to outdoor activity areas including parking lots, transit stops, children's play areas and plazas.

RESPONSE: Walkways are provided between Buildings A and B to parking areas and abutting rights-of-way. Walkways are not provided within the restricted access area of the facility.

3. Walkways shall be illuminated. Separate lighting shall not be required if existing lighting adequately illuminates the walkway.

RESPONSE: Building mounted light fixtures are provided throughout the facility, providing adequate light for safe access to the storage units.

4. Walkways shall be constructed with a well drained, hard-surfaced material or porous pavement and shall be at least five feet in unobstructed width.

RESPONSE: All proposed walkways are composed of concrete and are a minimum of 5-feet in width.

5. Standards for walkways through vehicular areas:

a. Walkways crossing driveways, parking areas and loading areas shall be constructed to be clearly identifiable to motorists through the use of different paving material, raised elevation, warning signs or other similar methods.

RESPONSE: All walkways are designed to comply with the standards of this code section.

b. Where walkways are adjacent to driveways, they shall be separated by a raised curb, bollards, landscaping or other physical barrier.

RESPONSE: Walkways which run parallel to driveways are separated by a 6-inch curb.

d. The exclusive use of a painted crossing zone to make walkways identifiable to motorists may be used only for portions of walkways which are shorter than 30 feet and located across driveways, parking lots, or loading areas.

RESPONSE: Painted cross walks do not exceed 30-feet in length.

e. Walkways bordering parking spaces shall be at least seven feet wide or a minimum of five feet wide when concrete bumpers, bollards, curbing, landscaping, or other similar improvements are provided which prevent parked vehicles or opening doors from obstructing the walkway.

RESPONSE: All proposed sidewalks that abut parking areas are 5-feet and greater in width.

6. The interconnected onsite walkway system shall connect to walkways in adjacent developments, or stub to the adjacent property line if the adjacent land is vacant or is developed without walkways.

a. Walkway stubs shall be located in consideration of topography and eventual redevelopment of the adjacent property.

b. Notwithstanding the remainder of Subsection 1005.03(D)(6), walkway linkages to adjacent development shall not be required within industrial developments, to industrial developments, or to vacant industrially zoned land

RESPONSE: Pedestrian linkages to existing, surrounding development has not been provided due to the security demands of this use.

E. Inside the UGB, except for industrial developments, a minimum of 50 percent of the street frontage of the development site shall have buildings located at the minimum front yard depth line.

RESPONSE: The minimum front yard depth for the CC zone is 15-feet. Building A is setback 15-feet from 82nd Ave. for the entire length of the building.

1. If the minimum front yard depth standard is less than 20 feet, the front yard depth may be increased to 20 feet provided pedestrian amenities are developed within the yard.

RESPONSE: No increases in the front yard depth are requested.

2. Primary building entrances for buildings used to comply with Subsection 1005.03(G), shall:

RESPONSE: Subsection 1005.03(G) does not apply to this project.

G. New retail, office, mixed use, and institutional buildings located on major transit streets shall have at least one public entrance facing a major transit street, or street intersecting a major transit street.

RESPONSE: This criteria does not apply to this project as it is not one of the designated uses. (retail, office, mixed use, and institutional)

1005.04 Building Design

A. The following standards apply to building facades visible from a public or private street or accessway and to all building façades where the primary entrance is located.

1. Building facades shall be developed with architectural relief, variety and visual interest and shall avoid the effect of a single, long or massive wall with no relation to human size. Examples of elements that subdivide the wall: change in plane, texture, masonry pattern or color, or windows.

RESPONSE: Building facades are designed specifically to address these standards.

2. Building facades shall have particular architectural emphasis at entrances and along sidewalks and walkways.

RESPONSE: The building entrances are accented with architectural design elements including signage, color changes and glazing.

3. Provide visual interest through use of articulation, placement and design of windows and entrances, building trim, detailing, ornamentation, planters or modulating building masses.

RESPONSE: Facades are designed to include multiple elements of visual interest.

4. Utilize human scale, and proportion and rhythm in the design and placement of architectural features.

RESPONSE: Repetition of design elements and glazing have been used to create a human scale and articulate proportion.

5. Use architectural features which are consistent with the proposed use of the building, level and exposure to public view, exposure to natural elements, and ease of maintenance.

RESPONSE: The proposed architectural design is consistent with the Self-storage use.

B. Requirements for building entries:

1. Public entries shall be clearly defined, highly visible and sheltered with an overhang or other architectural feature, with a depth of at least four feet.

2. Commercial, mixed-use and institutional buildings sited to comply with 1005.03(E) shall have public entries that face streets and are open to the public during all business hours.

RESPONSE: Building A entrance faces SE Glenco Rd. Access to the office in this building will be open to the public during business hours.

C. The street-facing façade of commercial, mixed-use and institutional buildings sited to comply with 1005.03(E) shall meet the following requirements:

1. Facades of buildings shall have transparent windows, display windows, entry areas, or arcades occupying a minimum of 60 percent of the first floor linear frontage.

2. Transparent windows shall occupy a minimum of 40 percent of the first floor linear frontage. Such windows shall be designed and placed for viewing access by pedestrians.

RESPONSE: The street facing facades comply with these standards. please refer to sheet A3 for glazing calculations.

D. Requirements for roof design:

2. For buildings, other than industrial buildings, with flat roofs or without visible roof surfaces, a cornice or other architectural treatment shall be used to provide visual interest at the top of the building.

RESPONSE: Cornice designs have been utilized throughout the project.

E. Requirements for exterior building materials:

1. Use architectural style, concepts, colors, materials and other features that are compatible with the neighborhood's intended visual identity.

2. Building materials shall be durable and consistent with the proposed use of the building, level and exposure to public view, exposure to natural elements, and ease of maintenance.

3. Walls shall be surfaced with brick, tile, masonry, stucco, stone or synthetic equivalent, pre-cast masonry, gypsum reinforced fiber concrete, wood lap siding, architecturally treated concrete, glass, wood, or a combination of these or other high-image materials.

4. Notwithstanding Subsection 1005.04(E)(3) metal may be approved as an exterior building material through design review pursuant to Section 1102 for specific high-image surfaces, canopies, awnings, doors, screening of roof mounted fixtures, or other architectural features.

RESPONSE: Colors and materials have been chosen to comply with this code section as well as to be aesthetically pleasing. Please refer to the Color Materials Legend on sheet A3.

G. Requirements to increase safety and surveillance:

1. Locate buildings and windows to maximize potential for surveillance of entryways, walkways, parking, recreation and laundry areas.

2. Provide adequate lighting for entryways, walkways, parking, recreation and laundry areas.

3. Locate parking and automobile circulation areas to permit easy police patrol.

4. Design landscaping to allow for surveillance opportunities.

5. Locate mail boxes where they are easily visible and accessible.

6. Limit fences, walls and, except for trees, landscaping between a parking lot and a street to a maximum of 30-inches in height.

7. Locate play areas for clear parental monitoring.

RESPONSE: Due to the use, security and surveillance of the facility is of the utmost importance. State-of-the art products and design are utilized throughout.

I. Requirements for compatibility with the intent of the design type or with the surrounding area. For purposes of Subsection 1005.04(I), design types are Centers, Station Communities or Corridor Streets as identified on Comprehensive Plan Map IV-8, Urban Growth Concept; X-CRC-1, Clackamas Regional Center Area Design Plan, Regional Center, Corridors and Station Community; X-SC-1, Sunnyside Corridor Community Plan, Community Plan Area and Corridor Design Type Location; or X-MC-1, McLoughlin Corridor Design Plan, Design Plan Area. The intent of these design types is stated in Chapter 4 or 10 of the Comprehensive Plan.

RESPONSE: 82nd Avenue is considered a Corridor Street, therefore these criteria apply to Building A.

1. Use shapes, colors, materials, textures, lines, and other architectural design features that enhance the design type area and complement the surrounding area and development.

RESPONSE: Colors and materials have been chosen to comply with this code section. Please refer to the Color Materials Legend on sheet A3.

3. Use building orientation and physical design, including setbacks and modulations, to ensure a development is compatible with other activities onsite, nearby properties, intended uses and the intent of the design type.

RESPONSE: The building facade along SE 82nd Ave. is designed to be compatible with surrounding development, while still facilitating the use.

4. Orient loading and delivery areas and other major service activity areas of the proposed project away from existing dwellings. Loading areas shall be located to the side or rear of buildings unless topography, natural features, rail service, or other requirements of this Ordinance dictate front-yard loading bays.

RESPONSE: The proposed loading areas are screened from adjacent residential areas by the proposed buildings.

6. Inside the Portland Metropolitan Urban Growth Boundary, use colors, materials and architectural designs to visually reduce the impact of large buildings.

RESPONSE: The facades of the outward facing buildings have architectural features which reduce the visual massing.

J. Requirements for screening mechanical equipment:

1. Rooftop mechanical equipment, except for solar energy systems, shall be screened from view by the use of parapet walls or a sight-obscuring enclosure around the equipment. The screen shall be constructed of one of the primary materials used on the primary facades, and shall be an integral part of the building's architectural design.

RESPONSE: Rooftop mechanical equipment is screened by the parapets. Please see sheet A3.

1005.05 Outdoor Lighting

A. Outdoor lighting devices:

1. Shall be architecturally integrated with the character of the associated structures, site design and landscape.

2. Shall not direct light skyward.

3. Shall direct downward and shield light; or direct light specifically toward walls, landscape elements or other similar features, so that light is directed within the boundaries of the subject property;

4. Shall be suitable for the use they serve, e.g. bollard lights along walkways, pole mounted lights for parking lots;

5. Shall be compatible with the scale and intensity of uses they are serving. Height of pole mounted fixtures shall not exceed 25 feet or the height of the tallest structure onsite, whichever is less; and

6. At entrances, shall be glare-free. Entrance lighting may not exceed a height of 12 feet and must be directed downward.

RESPONSE: All proposed site lighting is building mounted and designed to minimize glare and lighting seepage beyond the property lines.

1005.06 Additional Requirements

Development shall comply with a minimum of one of the following techniques per 20,000 square feet of site area. Regardless of site size, a minimum of one and a maximum of five techniques are required. Partial site area numbers shall be rounded.

RESPONSE: The project site is 132,124 SF, which requires a minimum of 5 techniques.

B. Use passive solar heating or cooling techniques to reduce energy consumption.

Examples of techniques:

1. Modulate building masses to maximize solar access.
2. For developments with more than one structure, locate taller structures to minimize negative impacts on solar access for the development site and adjacent sites.
3. Locate buildings to maximize windbreaks.
4. Locate structures and landscaping to avoid winter shading on the south side and optimize summer shading on the west and southwest sides of buildings.
6. Utilize deciduous vines on fences, trellises, and arbors to provide summer shade.

RESPONSE: (1.) The proposed self storage facility employees the above listed passive solar energy techniques.

N. Enhance the pedestrian connection between the development and neighborhood shopping areas, nearby transit, trails, bikeways or parks. Examples include additional width or pedestrian amenities.

RESPONSE: (2.) The project proposes a large (1000 SF), outdoor seating area at the corner of SE Glenco Road and SE 82nd Ave. This area includes pedestrian friendly elements.

R. Provide no more than the minimum number of surface parking spaces set out in Table 1015-2, all of which shall be no greater than the minimum dimensions allowed in Subsection 1015.04(B)(2).

RESPONSE: (3.) The minimum required parking is proposed.

V. Inside the UGB, a minimum of 75 percent of the street frontage of each lot shall have buildings located at the minimum front yard depth line. If the minimum front yard depth standard is zero, up to 20 feet of additional front yard depth may be provided where plazas, outdoor seating, or other pedestrian amenities are located.

RESPONSE: (4.) Building A fronts on SE 82nd Ave. This building exceeds 75% of the building located at the minimum front yard depth.

X. Locate buildings at the minimum side yard setback or within 10 feet of the side setback line, whichever is greater.

RESPONSE: (5.) Minimum side yard setbacks are proposed.

1005.07 Modifications

RESPONSE: No Modifications requests are proposed.

1005.08 Clackamas Regional Center Area Design Standards

Subsection 1005.08 applies in the Clackamas Regional Center Area, including the Regional Center and the Fuller Road Station Community, as identified on Comprehensive

Plan Map X-CRC-1, Clackamas Regional Center Area Design Plan Regional Center, Corridors, and Station Community. Where these standards conflict with other provisions in Section 1000, Subsection 1005.08 shall take precedence.

RESPONSE: This Section applies to the project site.

A. Clackamas Regional Center Area Design Plan: Development is subject to the Clackamas Regional Center Area Design Plan in Chapter 10 of the Comprehensive Plan.

RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan.

B. Urban Design Elements: New development is subject to the urban design elements shown on Comprehensive Plan Map X-CRC-3, Clackamas Regional Center Area Design Plan Urban Design Elements. The urban design elements are described in the Clackamas Regional Center Area Design Plan in Chapter 10 of the Comprehensive Plan.

1. Urban design elements provided in a development may be used to reduce gross site area for calculating minimum density requirements in Subsection 1012.08, and to meet minimum landscaping requirements in Section 1009, Landscaping.

RESPONSE: Urban design elements were considered in the landscape plan calculations. These numbers are presented on the Landscape Plan.

I. New development shall not be sited such that it precludes the construction of the new walkways, or eliminates the existing walkways, that are shown on Comprehensive Plan Map X-CRC-7a, Clackamas Regional Center Area Design Plan Walkway Network, or identified in the Clackamas Regional Center Pedestrian/Bicycle Plan adopted by reference in Appendix A of the Comprehensive Plan, unless an alternative walkway location that provides a similar connection is established. An alternative walkway location shall not be deemed “similar” to a planned or existing location unless:

1. It provides comparably safe, direct, and convenient pedestrian access to significant destinations, such as transit facilities, major employers, multifamily dwelling complexes, and retail and service establishments; and

2. It fulfills a comparable function in terms of filling gaps in the pedestrian circulation system planned for the Clackamas Regional Center Area.

RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan. An outdoor seating area at the corner of SE 82nd Avenue and SE Glenco Road is proposed. This Urban Design element provides excellent, safe and direct pedestrian connections between the rights-of-way and the project office and public parking area.

1005.09 Regional Center Design Standards

Subsection 1005.09 applies in the Regional Center, as identified on Comprehensive Plan Map X-CRC-1, Clackamas Regional Center Area Design Plan Regional Center, Corridors, and Station Community. Where these standards conflict with other provisions in Section 1000, Subsection 1005.09 shall take precedence.

B. New buildings shall have at least one public entrance oriented to a street. Private streets used to meet this standard shall include the elements identified in Subsection 1005.08(G).

RESPONSE: The entrance to Building A (public, office entrance) is oriented toward SE Glenco Rd.

C. Pedestrian amenities are required between the building and the front lot line. The following guidelines apply to pedestrian amenities used to meet this requirement:

1. Pedestrian areas include plazas, courtyards, outdoor seating areas for restaurants, pocket parks, and atriums when there is direct access for pedestrians. Pedestrian areas in front of buildings should be visible from the street.

Response: A pedestrian outdoor seating area is located at the corner of SE 82nd Ave. and SE Glenco Rd.

2. Pedestrian areas must include landscape planters and at least two of the following amenities for every 100 square feet of pedestrian area: lawn areas with trees and seating; awnings or other weather protection; kiosks; outdoor eating areas with seating; water features with seating; and drinking fountains.

RESPONSE: The proposed entry/outdoor seating area is approximately 1000 SF. Planters, trees, outdoor seating, building awning at the entrance, site lighting, bike racks and pedestrian scale architectural features area all associated with this area.

ZDO Section 1006

Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management and Erosion Control.

1006.01 General Standards

A. The location, design, installation, and maintenance of all utility lines and facilities shall be carried out with minimum feasible disturbance of soil and site consistent with the rules and regulations of the surface water management regulatory authority.

RESPONSE: Site construction and utility installation will be completed with the minimal disturbance possible.

B. All development that has a need for electricity, natural gas, and communications services shall install them pursuant to the requirements of the utility district or company serving the development. Except where otherwise prohibited by the utility district or company, all such facilities shall be installed underground.

RESPONSE: All proposed and existing utilities will be underground for this project.

C. Coordinated installation of necessary water, sanitary sewer, and surface water management and conveyance facilities is required.

RESPONSE: Proposed utility services for fire, water, sewer and storm will be provided for the proposed buildings.

D. Easements shall be provided along lot lines as deemed necessary by the County, special districts, and utility companies. Easements for special purpose uses shall be of a width deemed appropriate by the responsible agency.

RESPONSE: Easements will be provided for all public utilities and access through the site.

1006.02 Street Lights

Street lights are required for all development inside the Portland Metropolitan Urban Growth Boundary. The following standards apply:

A. Street lighting shall be installed pursuant to the requirements of Clackamas County Service District No. 5 and the electric company serving the development. A street light

shall be installed where a new road intersects a County road right-of-way and, in the case of subdivisions, at every intersection within the subdivision.

RESPONSE: If required, street lighting will be included in the permit design per the applicable requirements.

1006.03 Water Supply

A. All development which has a need for, or will be provided with, public or community water service shall install water service facilities and grant necessary easements pursuant to the requirements of the district or company serving the development.

RESPONSE: This project proposes public water connection and facilities which meet the requirements of the service provider.

B. Approval of a development that requires public or community water service shall be granted only if the applicant provides a preliminary statement of feasibility from the water system service provider.

1. The statement shall verify that water service, including fire flows, is available in levels appropriate for the development and that adequate water system capacity is available in source, supply, treatment, transmission, storage and distribution.

Alternatively, the statement shall verify that such levels and capacity can be made available through improvements completed by the developer or the system owner.

RESPONSE: Statement of Feasibility have been obtained from Clackamas River Water (Tab 6).

1006.06 Public Sanitary Sewer Standards

A. All development which has a need for public/private sanitary sewers shall install the facilities pursuant to the requirements of the district or company serving the development. Installation of such facilities shall be coordinated with the extension of necessary water services and storm drainage facilities.

RESPONSE: This project proposes public sanitary sewer connection and facilities which meet the requirements of the service provider.

B. Approval of a development that requires public sanitary sewer service shall be granted only if the applicant provides a preliminary statement of feasibility from the sanitary sewage treatment service provider and the collection system service provider.

1. The statement shall verify that sanitary sewer capacity in the wastewater treatment system and the sanitary sewage collection system is available to serve the development or can be made available through improvements completed by the developer or the system owner.

2. The service provider may require preliminary sanitary sewer system plans and calculations for the proposed development prior to signing a preliminary statement of feasibility.

3. The statement shall be dated no more than one year prior to the date a complete land use application is filed and need not reserve sanitary sewer system capacity for the development.

RESPONSE: Statement of Feasibility have been obtained from Clackamas Water Environmental Service. (Tab 6).

1006.08 Surface Water Management Standards

The following surface water management and erosion control standards apply:

A. Positive drainage and adequate conveyance of surface water shall be provided from roofs, footings, foundations, and other impervious or near-impervious surfaces to an appropriate discharge point.

RESPONSE: The storm system is designed to capture all runoff onsite with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywell that will full infiltrate all design storms.

B. The requirements of the surface water management regulatory authority apply. If the County is the surface water management regulatory authority, the surface water management requirements of the Clackamas County Roadway Standards apply.

RESPONSE: The surface water management requirements of the Clackamas County Roadway Standards have been met.

C. Approval of a development shall be granted only if the applicant provides a preliminary statement of feasibility from the surface water management regulatory authority. The statement shall verify that adequate surface water management, treatment and conveyance is available to serve the development or can be made available through improvements completed by the developer or the system owner.

1. The surface water management regulatory authority may require a preliminary surface water management plan and report, natural resource assessment, and buffer analysis prior to signing the preliminary statement of feasibility.

2. The statement shall be dated no more than one year prior to the date a complete land use application is filed and need not reserve surface water treatment and conveyance system capacity for the development.

RESPONSE: Statement of Feasibility have been obtained from Clackamas Water Environmental Service. (Tab 6).

D. Development shall be planned, designed, constructed, and maintained to:

1. Protect and preserve existing natural drainage channels to the maximum practicable extent;

2. Protect development from flood hazards;

3. Provide a system by which water within the development will be controlled without causing damage or harm to the natural environment, or to property or persons within the drainage basin;

4. Ensure that waters drained from the development are substantially free of pollutants, including sedimentary materials, through such construction and drainage techniques as sedimentation ponds, reseeding, and phasing of grading; and

5. Ensure that waters are drained from the development in such a manner that will not cause erosion to any greater extent than would occur in the absence of development.

RESPONSE: No water ways, flood plain or natural resources are known within or adjacent to the proposed property. The storm system is designed to capture all runoff onsite with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywells that will full infiltrate all design storms.

I. A surface water management and erosion control plan is required for significant residential, commercial, industrial, and institutional development. The plan shall include:

1. The methods to be used to minimize the amount of runoff siltation and pollution created from the development both during and after construction; and
2. Other elements required by the surface water management authority.

1006.07 Preliminary Statement of Feasibility Exceptions

RESPONSE: The storm system is designed to capture all runoff onsite through proposed trapped catch basins with no site runoff leaving the site. In addition, no adjacent site runoff will be collected on site. The storm system is also design to convey all onsite runoff to onsite drywells that will full infiltrate all design storms.

ZDO Section 1007 Roads and Connectivity

1007.01 General Provisions

A. The location, alignment, design, grade, width, and capacity of all roads shall be planned, coordinated, and controlled by the Department of Transportation and Development and shall conform to Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards. Where conflicts occur between Section 1007, the Comprehensive Plan, and the Clackamas County Roadway Standards, the Comprehensive Plan shall control.

RESPONSE: No new roads are planned with this project, however, half street improvements will be completed with the coordination of the County and ODOT.

B. Right-of-way dedications and improvements shall be required of all new developments, including partitions, subdivisions, multifamily dwellings, two- and three-family dwellings, condominiums, single-family dwellings, and commercial, industrial, and institutional uses, as deemed necessary by the Department of Transportation and Development and consistent with Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

RESPONSE: Right-of-way dedications and half street improvements will be completed with the coordination of the County and ODOT for both SE Glenco Rd. and SE 82nd Ave.

C. New developments shall have access points connecting with existing private, public, county, or state roads.

1. Intersection spacing and access control shall be based on Subsection 3.08.110(E) of the Metro Code (Regional Transportation Functional Plan); Chapters 5 and 10 of the Comprehensive Plan; and the Clackamas County Roadway Standards.

3. Access control shall be implemented pursuant to Chapter 5 of the Comprehensive Plan and the Clackamas County Roadway Standards considering best spacing for pedestrian access, traffic safety, and similar factors as deemed appropriate by the Department of Transportation and Development.

4. Approaches to public and county roads shall be designed to accommodate safe and efficient flow of traffic and turn control where necessary to minimize hazards for other vehicles, pedestrians, and bicyclists.

5. Joint access and circulation drives utilizing reciprocal easements shall be utilized as deemed necessary by the Department of Transportation and Development. In the NC District, joint street access for adjacent commercial developments shall be required.

RESPONSE: This project does not propose an access to SE 82nd Ave. The project access is from SE Glenco Road. This access driveway is setback approximately 48-feet from the intersection of SE Glenco Road and SE 82nd Ave.

Due to the need for controlled access, the shared access driveway from 82nd Ave. and the property immediately to the north will not be utilized by this project. The shared access easement will remain vacant (no building encroachment) to facilitate future redevelopment use and extension of a future street between SE 82nd Ave. and SE Poplar Lane.

10. Inside the Portland Metropolitan Urban Growth Boundary:

a. The development shall have no more than the minimum number of driveways required by the Department of Transportation and Development on all arterial and collector streets.

RESPONSE: This project does not propose an access to SE 82nd Ave.

b. For properties having more than one street frontage, driveways shall be located on the street with the lowest functional classification, if feasible.

RESPONSE: This project does not propose an access to SE 82nd Ave. The project access is from SE Glenco Road. A driveway providing one-way out of the facility is also proposed on SE 82nd Ave, at the SW corner of the site.

c. Driveways shall be no wider than the minimum width allowed by the Clackamas County Roadway Standards.

RESPONSE: The driveway access are designed to meet code requirements for width and spacing.

d. Driveways shall be located so as to maximize the number of allowed on-street parking spaces, the number of street trees, and optimum street tree spacing

RESPONSE: On-street parking is not currently facilitated on SE Glenco Road, or SE 82nd Ave.

E. All roads shall be designed and constructed to adequately and safely accommodate vehicles, pedestrians, and bicycles according to Chapters 5 and 10 of the Comprehensive Plan and the Clackamas County Roadway Standards. Development-related roadway adequacy and safety impacts to roadways shall be evaluated pursuant to the Clackamas County Roadway Standards and also to Oregon Department of Transportation standards for state highways.

RESPONSE: The road widening design for SE Glenco Road is required to meet the width requirement for the facilities listed.

1007.02 Public and Private Roadways

A. All roadways shall be developed according to the classifications, guidelines, tables, figures, and maps in Chapters 5 and 10 of the Comprehensive Plan and the provisions of the Clackamas County Roadway Standards.

RESPONSE: The road widening design as part of this project was completed to meet the County and ODOT standards.

E. New developments, subdivisions, and partitions may be required to dedicate land for right-of-way purposes and/or make road frontage improvements to existing rights-of-way as deemed necessary by the Department of Transportation and Development and consistent with Section 1007, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

RESPONSE: The proposed development will provide the required dedication to allow for the correct ODOT and County road sections for the half street improvements.

1007.06 Pedestrian and Bicycle Facilities

A. General Standards: Pedestrian and bicycle facilities shall be developed according to the classifications and guidelines listed in Section 1007, Comprehensive Plan Figures 5-1 through 5-3, Typical Roadway Cross Sections, Chapters 5 and 10 of the Comprehensive Plan, and the Clackamas County Roadway Standards.

B. Pedestrian and Bicycle Facility Design: Pedestrian and bicycle facilities shall be designed to:

1. Minimize conflicts among automobiles, trucks, pedestrians, and bicyclists;
2. Provide safe, convenient, and an appropriate level of access to various parts of the development and to locations such as schools, employment centers, shopping areas, adjacent developments, recreation areas and open space, and transit corridors;
3. Allow for unobstructed movements and access for transportation of disadvantaged persons; and

4. Be consistent with Chapters 5 and 10 of the Comprehensive Plan; Comprehensive Plan Maps 5-2a, Planned Bikeway Network, Urban, 5-2b, Planned Bikeway Network, Rural, and 5-3, Essential Pedestrian Network; North Clackamas Parks and Recreation District's (NCPRD) Park and Recreation Master Plan; and Metro's Regional Trails and Greenways Map.

RESPONSE: New sidewalks along both street frontages are proposed to meet applicable requirements.

F. Sidewalk Location: Sidewalks required by Subsection 1007.06(C) or (D) shall be constructed on:

RESPONSE: Proposed sidewalk improvements are included for both public roadway frontages to meet County and ODOT standards.

H. Sidewalk and Pedestrian Pathway Width: Sidewalks and pedestrian pathways shall be constructed to the minimum widths shown in Table 1007-1, Minimum Sidewalk and Pedestrian Pathway Width, and be consistent with applicable requirements of Chapters 5 and 10 of the Comprehensive Plan.

RESPONSE: As proposed, the new sidewalk along SE 82nd Ave. is 8-feet in width and the proposed sidewalk along SE Glenco Rd. is 5-feet in width.

K. Bikeways: Bikeways shall be required as follows:

1. Shoulder bikeways, bike lanes, bike paths, or cycle tracks shall be included in the reconstruction or new construction of any street if a bikeway is indicated in Chapters 5 and 10 of the Comprehensive Plan and on Comprehensive Plan Map 5-2a or 5-2b; NCPRD's Park and Recreation Master Plan; or Metro's Regional Trails and Greenways Map.

RESPONSE: Final design plans for SE 82nd Ave. will include a bike lane if required.

1007.05 Transit Amenities

All residential, commercial, institutional, and industrial developments on existing and planned transit routes shall be reviewed by Tri-Met or other appropriate transit provider

to ensure appropriate design and integration of transit amenities into the development. The design shall not be limited to streets, but shall ensure that pedestrian/bikeway facilities and other transit-supportive features such as shelters, bus pull-outs, park-and-ride spaces, and signing will be provided. The designs shall comply with Tri-Met standards and specifications.

RESPONSE: No transit facilities currently exist or are planned within the rights-of-way that about this site.

1007.06 Street Trees

A. Within the Portland Metropolitan Urban Growth Boundary, street trees are required on all road frontage—except frontage on private roads or access drives-- for subdivisions, partitions, multifamily dwellings, three-family dwellings, attached single-family dwellings where three or more dwelling units are attached to one another, and commercial, industrial, or institutional developments, except that for structural additions to existing commercial, industrial, or institutional buildings, street trees are required only if the addition exceeds 10 percent of the assessed value of the existing structure, or 999 square feet. Street trees shall comply with the following standards:

1. Partial or complete exemptions from the requirement to plant street trees may be granted on a case-by-case basis. Exemptions may be granted, for example, if the exemption is necessary to save existing significant trees which can be used as a substitute for street trees.

2. Street trees to be planted shall be chosen from a County-approved list of street trees (if adopted), unless approval for planting of another species is given by the Department of Transportation and Development.

3. Location and planting of street trees may be influenced by such conditions as topography, steep terrain, soil conditions, existing trees and vegetation, preservation of desirable views, and solar access.

4. Planting of street trees shall be coordinated with other uses which may occur within the street right-of-way, such as bikeways, pedestrian paths, storm drains, utilities, street lights, shelters, and bus stops.

5. Street trees at maturity shall be of appropriate size and scale to complement the width of the street or median area.

RESPONSE: Street trees are proposed along SE 82nd Ave. and SE Glencoe Road. Trees have been chosen from the county approved street tree list. Street tree locations are coordinated with existing and proposed utilities, topography, soil conditions and other right-of-way uses. See landscape plan L1.0.

B. Street trees required for developments in the Clackamas Regional Center Area shall comply with the following standards:

1. Street trees are required along all streets, except for drive aisles in parking lots.

2. When determining the location of street trees, consideration should be given to accommodating normal retail practices in front of buildings such as signage, outdoor display, loading areas, and pullout lanes.

3. Street trees are required along private access streets under the following conditions:

a. On both sides when the access point is a signalized intersection;

- b. On both sides when the street section has four or more lanes at the access point;
- c. On both sides when the private street is developed to comply with building orientation standards;
- d. On a minimum of one side when the street section has one or two lanes, and the street is not at a signalized intersection or is not used to meet the structure orientation standards of Subsections 1005.08(C) and 1005.09(B); and
- e. On a minimum of one side of the street when access is shared with adjacent property. Adjoining property shall be required to install trees on its side of the access street when the property is developed.

RESPONSE: Street trees are located in the planting strip between the sidewalk and road along SE 82nd Ave. Along Glencoe Road the street trees are in the planting strip and proposed behind the sidewalk due to conflicts with existing utilities.

1007.07 Transportation Facilities Concurrency

A. Subsection 1007.07 shall apply to the following development applications: design review, subdivisions, partitions, and conditional uses.

RESPONSE: This section applies to the Trojan Storage project.

B. Approval of a development shall be granted only if the capacity of transportation facilities is adequate or will be made adequate in a timely manner.

RESPONSE: "As demonstrated in the October 16, 2019 Transportation Impact Study prepared by Lancaster Engineering, all study area intersections on SE 82nd Avenue and SE Glencoe Road will operate within applicable performance standards with the project in place during the morning and evening peak hours. Therefore, the capacity of the impacted transportation facilities is adequate and this criterion is satisfied."

ZDO Section 1009 Landscaping

1009.01 General Provisions

A. Landscaping materials shall be selected and sited to produce a hardy and low maintenance landscaped area with an emphasis on fast-growing plants. Selection shall include consideration of soil type and depth, spacing, exposure to sun and wind, slope and contours of the subject property, building walls and overhangs, and compatibility with existing vegetation to be preserved. Notwithstanding the requirement for hardiness, annuals are permitted as provided in Subsection 1009.01(B).

RESPONSE: Landscape plants have been selected based on growth rate, sun exposure, spacing, and compatibility with proposed buildings and usage. No annuals are proposed.

B. A variety of plants, intermixed throughout landscaped areas, shall be provided, as follows:

1. Evergreen and deciduous;
2. Trees, shrubs, and groundcover;
3. Plants of varying textures;
4. Plants of varying widths and heights at maturity; and

5. Plants with seasonal color interest (e.g., foliage, flowering perennials, annuals).

RESPONSE: A variety of evergreen and deciduous trees, shrubs and groundcovers are proposed. See the landscape plan sheet L1.0.

C. The planting of invasive non-native or noxious vegetation shall be prohibited, and existing invasive non-native or noxious vegetation shall be removed.

RESPONSE: No invasive or noxious plants are proposed.

D. Landscaped areas shall not be used for other purposes, such as storage or display of automobiles, equipment, merchandise, or materials.

RESPONSE: Landscape areas are planted or exclusively for the use of pedestrians. No other use will be allowed.

E. Landscaping of the unimproved area between a lot line and the improved portion of an adjacent road right-of-way shall be required when there are no immediate plans to develop or otherwise disturb the unimproved area, and one or more of the following apply:

1. The subject property is located inside the Portland Metropolitan Urban Growth Boundary;
2. Landscaping is necessary to present an appearance consistent with the proposed development as viewed from the road;
3. Landscaping is necessary to reduce dust, noise, erosion, or fire hazard; or
4. The road is designated as a scenic road on Comprehensive Plan Map 5-1, Scenic Roads.

RESPONSE: Landscaping is proposed for all areas that are not paved or used for buildings.

F. Landscaping shall be used to highlight public entrances to buildings. If—due to the depth of a front setback, a required walkway, or both—there is insufficient area to permit a typical, in-ground landscaping bed between a public entrance and a front lot line, this requirement may be met with trellises, hanging baskets, or planters, any of which shall include plants.

RESPONSE: Ornamental grasses and dwarf smoke bush are proposed adjacent to the public entrance plaza, front and south lot lines.

G. Where feasible, landscaping shall be required adjacent to walkways and other areas intended for pedestrian use.

RESPONSE: Landscaping is proposed adjacent to the public sidewalks.

H. Existing significant plants, terrain, and other natural features shall be incorporated into the landscaping design and development if such features are required to be retained by other provisions of this Ordinance or if otherwise feasible.

RESPONSE: The existing parcel is vacant and devoid of existing significant plants, terrain or other natural features.

1009.02 Minimum Area Standards

A. Table 1009-1, Minimum Landscaped Area, establishes the minimum percentage of the area of the subject property that shall be landscaped.

1. The minimum landscaped area shall be calculated after subtracting any public dedications from the area of the subject property.

2. Landscaping in adjacent rights-of-way shall not count toward compliance with the minimum landscaped area.

3. Requirements for surface parking and loading area landscaping, screening and buffering, scenic roads landscaping, landscaping strips, and recreational areas and facilities set forth in Section 1009 apply regardless of whether compliance with those requirements results in landscaping a greater percentage of the subject property than is required by Table 1009-1.

Table 1009-1: Minimum Landscaped Area

Zoning District	Minimum Landscaped Area
CC, PMU, RCC, RCO, RTL	10 percent

RESPONSE: TOTAL SITE AREA = 132,124 SF

LANDSCAPE AREA REQUIRED 10% OF SITE = 13,212 SF

LANDSCAPE AREA PROPOSED 10.5% OF SITE = 11,526 SF
PLUS PED. AMENITIES FOR LANDSCAPE AREA = 2,834 SF
TOTAL LANDSCAPE AREA = 14,360 SF

4. A minimum of 75 percent of the minimum landscaped area required by Table 1009-1—excluding any area occupied by pedestrian amenities, active recreational areas, or edible gardens—shall be landscaped with native or drought-tolerant plants.

5. Outdoor recreational areas required by Subsection 1009.08(A), as well as outdoor recreational areas in the MRR District, shall count toward the minimum landscaped area required by Table 1009-1, except that impervious surface area exceeding 25 percent of the outdoor recreational area shall be excluded.

6. Edible gardens may comprise a maximum of 10 percent of the minimum landscaped area required by Table 1009-1.

7. Green roofs may comprise a maximum of 25 percent of the minimum landscaped area required by Table 1009-1.

8. Turf lawn may comprise a maximum of 10 percent of the minimum landscaped area required by Table 1009-1. However, this limitation shall not apply to active recreational areas, provided that no other areas of the subject property are planted in turf lawn, and it shall not apply to cemeteries.

9. Pedestrian amenities may comprise a maximum of one-third of the minimum landscaped area required by Table 1009-1. However, no more than 15 percent of the minimum landscaped area required by Table 1009-1 and developed with pedestrian amenities shall have an impervious surface.

10. Area occupied by walls, fences, or trellises constructed to comply with Subsections 1009.03 and 1009.04 shall count toward the minimum landscaped area required by Table 1009-1.

RESPONSE: LANDSCAPE AREA PROPOSED 10.5% OF SITE = 11,526 SF
PLUS PED. AMENITIES FOR LANDSCAPE AREA = 2,834 SF
TOTAL LANDSCAPE AREA = 14,360 SF

1009.03 Surface Parking and Loading Area Landscape

Surface parking and loading areas shall be landscaped as follows:

A. Surface parking areas that include more than 15 parking spaces shall comply with the following landscaping requirements:

RESPONSE: Although this project proposes 26 parking spaces, none are clustered in a group of more than eight. Therefore this code section does not apply.

B. Perimeter landscaping requirements for surface parking and loading areas adjacent to abutting lots or rights-of-way are as follows:

1. A landscaping strip with a minimum width of five feet shall be provided adjacent to the perimeter of the surface parking or loading area, except:

2. The required landscaping strips shall comply with the following standards:

a. Sufficient low shrubs shall be planted to form a continuous screen three feet high and 95 percent opaque, year-round; or a three-foot-high masonry wall or berm may be substituted for the shrubs. When applied along front lot lines, the screen or wall is to be placed along the interior side of the landscaping strip and shall be 30 inches high instead of three feet high.

b. In addition, one tree is required for every 30 linear feet of landscaping strip, or as otherwise required to provide a tree canopy over the landscaping strip.

c. Ground cover plants must fully cover the remainder of the landscaped area.

RESPONSE: A five foot landscape strip is proposed adjacent to the loading area along the west property line.

3. A perimeter landscape strip is not required for a surface parking or loading area adjacent to an abutting lot if one or more interior driveways connect the two lots and if the abutting lot also is developed with a surface parking or loading area adjacent to the shared lot line.

1009.04 Screening and Buffering

A. Screening shall be used to eliminate or reduce the visual impacts of the following:

1. Service areas and facilities, such as loading areas and receptacles for solid waste or recyclable materials;

RESPONSE: The parking, loading and maneuvering areas are largely internally located within the facility. This allows the buildings themselves to screen these areas.

Landscape screening is provided along the southern and western property line.

The trash/recycling area is located within Building B.

B. Screening shall be accomplished by the use of sight-obscuring evergreen plantings, vegetated earth berms, masonry walls, sight-obscuring fences, proper siting of disruptive elements, building placement, or other design techniques.

RESPONSE: Screening provided along the southern and western property line includes site obscuring hedge and shrub plantings.

C. Screening shall be required to substantially block any view of material or equipment from any point located on a street or accessway adjacent to the subject property.

Screening from walkways is required only for receptacles for solid waste or recyclable materials. A sight-obscuring fence at least six feet in height and up to a maximum of 10 feet in height shall be required around the material or equipment.

RESPONSE: This project does not propose exterior storage of materials or equipment.

D. Buffering shall be used to mitigate adverse visual impacts, dust, noise, or pollution, and to provide for compatibility between dissimilar adjoining uses. Special consideration shall be given to buffering between residential uses and commercial or industrial uses, and in visually sensitive areas.

RESPONSE: Adjacent uses do not require buffering.

1009.06 Landscape Strips

C. In all other zoning districts, except SCMU, a landscaping strip a minimum of five feet wide shall be provided abutting front lot lines. (See Subsection 1005.10(L) for additional SCMU landscaping requirements.)

1. This requirement will be waived or reduced in the NC, PMU, and VCS Districts, which are districts that have no minimum front setback standard, to the extent necessary to accommodate a building with a front setback of less than five feet.

2. If—due to the depth of a front setback and the need to accommodate a required walkway, required pedestrian amenities, or both—there is insufficient area to permit a five-foot-wide landscaping strip, the landscaping strip may be reduced in width or the landscaping requirement may be met with a linear arrangement of trellises, hanging baskets, or planters, any of which shall include plants.

RESPONSE: The front landscape strip varies in width from 18'-6" to 19'-6" and is planted with trees, shrubs, and groundcovers. See landscape plan L1.0.

1009.07 Fences and Walls

A. Fences and walls shall be of a material, color, and design complementary to the development.

RESPONSE: Chain link fencing and gates are proposed.

1009.09 Erosion Control

A. Graded areas shall be re-vegetated with suitable plants to ensure erosion control.

B. Netting shall be provided, where necessary, on sloped areas while ground cover is being established.

RESPONSE: All graded areas that are not paved, will be re-vegetated prior to project completion.

1009.10 Planting and Maintenance

A. Impervious weed barriers (e.g, plastic sheeting) are prohibited.

RESPONSE: Impervious weed barriers are not proposed.

B. Plants shall not cause a hazard. Plants over walkways, sidewalks, pedestrian pathways, and seating areas shall be pruned to maintain a minimum of eight feet below the lowest hanging branches. Plants over streets, bikeways, accessways, and other vehicular use areas shall be pruned to maintain a minimum of 15 feet below the lowest hanging branches.

RESPONSE: Trees and shrubs shall be pruned and maintained so as not to cause a hazard and follow these pruning guidelines.

C. Plants shall be of a type that, at maturity, typically does not interfere with above or below-ground utilities or paved surfaces.

D. Plants shall be installed to current nursery industry standards.

RESPONSE: All plants shall be installed according to American Standards for nursery stock (ANSI Z60.1) as well as detailed drawings and specifications.

E. Plants shall be properly guyed and staked to current nursery industry standards as necessary. Stakes and guys shall not interfere with vehicular or pedestrian traffic, shall be loosened as needed to prevent girdling of trunks, and shall be removed as soon as sufficient trunk strength develops, typically one year after planting.

F. Landscaping materials shall be guaranteed for a period of one year from the date of installation. The developer shall either submit a signed maintenance contract for the one-year period or provide a performance surety pursuant to Section 1311, Completion of Improvements, Sureties, and Maintenance, covering the landscape maintenance costs for the one-year period.

RESPONSE: Landscape materials are warranted for one year from final acceptance. See landscape and irrigation specs sheet L3.0.

G. Plants shall be suited to the conditions under which they will be growing. As an example, plants to be grown in exposed, windy areas that will not be irrigated shall be sufficiently hardy to thrive under these conditions. Plants shall have vigorous root systems, and be sound, healthy, and free from defects and diseases.

RESPONSE: Plants have been selected that are well suited to the growing conditions in which they are planted.

H. When planted, deciduous trees shall be fully branched, have a minimum caliper of two inches, and have a minimum height of eight feet.

RESPONSE: Deciduous trees are proposed to be 2" cal. at time of planting.

I. When planted, evergreen trees shall be fully branched, have a minimum height of eight feet, and have only one leader.

RESPONSE: Evergreen trees are proposed to be fully branched and a minimum of eight feet at the time of planting.

J. Shrubs shall be supplied in minimum one-gallon containers or eight-inch burlap balls with a minimum spread of 12 inches.

K. Ground cover shall be planted a maximum of 30 inches on center with a maximum of 30 inches between rows. Rows of plants shall be staggered. Ground cover shall be supplied in minimum four-inch containers, except that the minimum shall be reduced to two and one-quarter inches or equivalent if the ground cover is planted a minimum of 18 inches on center.

L. Plants shall be spaced so that ground coverage three years after planting is expected to be 90 percent, except where pedestrian amenities, rainwater collection systems, or outdoor recreational areas count as landscaping pursuant to Subsection 1009.02. Areas under tree drip lines count as ground coverage.

RESPONSE: Plant materials have been chosen and sized to achieve 90 percent coverage of the landscape areas within three years.

M. Irrigation of plants shall be required, except in wooded areas, wetlands, and in river and stream buffers. The irrigation system shall be automatic, except that hose bibs and manually operated methods of irrigation may be permitted in small landscaped areas close to buildings. Automatic irrigation systems are subject to the following standards:
RESPONSE: A fully automatic, underground irrigation system is specified.

ZDO Section 1015 Parking and Loading

1015.01 General Standards

A. Inside the Portland Metropolitan Urban Growth Boundary (UGB), parking, loading, and maneuvering areas shall be hard-surfaced, unless a permeable surface is required for surface water management pursuant to the regulations of the surface water management authority or in order to comply with Subsection 1006.06.

RESPONSE: All parking and loading areas are paved.

C. Parking and loading requirements for uses and structures not specifically listed in Tables 1015-1, Automobile Parking Space Requirements; 1015-2, Minimum Required Bicycle Parking Spaces; and 1015-3, Minimum Required Off-Street Loading Berths shall be subject to the requirements for the most similar use.

RESPONSE: This project would fall under the "Warehouse and Storage Distribution" use.

D. Motor vehicle parking, bicycle parking, and loading areas shall be separated from one another.

RESPONSE: The proposed vehicular and loading spaces are distributed throughout the site. The bike parking is located adjacent to the office entrance.

1015.02 Motor Vehicle Parking Area Standards

A. Off-street parking areas shall be designed to meet the following requirements:

1. Off-street motor vehicle parking areas shall be provided in defined areas of the subject property. No area shall be considered a parking space unless it can be shown that the area is accessible and usable for that purpose and has required maneuvering area for vehicles. Required backing and maneuvering areas shall be located entirely onsite.

2. Automobile parking spaces shall be a minimum of 8.5 feet wide and 16 feet long, except that parallel spaces shall be a minimum of 8.5 feet wide and 22 feet long.

3. A minimum of 25 percent of required parking spaces shall be no larger than 8.5 feet wide and 16 feet long.

4. Parking areas shall comply with minimum dimensions for curb length, stall depth, and aisle width established by the Clackamas County Roadway Standards; these dimensions are based on the orientation (e.g., 45-degree, 90-degree), length, and width of the spaces.

5. Double-loaded, ninety-degree angle parking bays shall be utilized where possible.

6. A minimum of one parking space or five percent of the required spaces, whichever is greater, shall be marked and signed for use as carpool/vanpool spaces. These spaces shall be the closest employee automobile parking spaces to the building

entrances normally used by employees, but shall not take priority over any spaces required for individuals with disabilities.

RESPONSE: As proposed, the vehicular parking spaces distributed throughout the site all comply with the dimensional standards of this code section. Please refer to the Site Plan for verification.

8. Where feasible, shared driveway entrances, shared parking and maneuvering areas, and interior driveways between adjacent parking lots shall be required.

RESPONSE: The proposed use requires that the facility have restricted access. Therefore, this requirement is not feasible.

B. Parking Minimums: The minimum number of parking spaces listed in Table 1015-1, Automobile Parking Space Requirements, applies unless modified in Subsection 1015.02(D).

RESPONSE: Per subsection 1015.02, (minimum of .2 stalls per 1000 SF of building) a minimum of 26 stalls are required. 26 stalls (5 standard and 21 parallel stalls) are proposed.

C. Parking Maximums:

RESPONSE: A maximum of 52 spaces are allowed.

Table 1015-1: Automobile Parking Space Requirements¹

Land Use Category	Minimum Parking Spaces	Maximum Parking Spaces (Urban Zone A)	Maximum Parking Spaces (Urban Zone B)
Warehouse and Storage Distribution, and Terminals (air, rail, truck, water, etc.) **Maximum parking requirements apply only to warehouses 150,000 gross square feet or greater.			
Zero to 49,999 square feet	0.3	None	None
50,000 square feet and over	0.2	0.4**	0.5**

Parking ratios are based on spaces per 1,000 square feet of gross leasable area, unless otherwise stated.

1015.03 Bicycle Parking Standards

A. Bicycle parking areas shall meet the following on-site locational requirements:

1. Bicycle parking racks shall be located in proximity to an entrance but shall not conflict with pedestrian needs.
2. At least 75 percent of the bicycle parking spaces shall be located within 50 feet of a public entrance to the building.
3. Bicycle parking may be provided within a building, if the location is easily accessible for bicycles.
4. Bicycle parking for multiple uses, or a facility with multiple structures, may be clustered in one or several locations within 50 feet of each building's entrance.

5. If the bicycle parking is not easily visible from the street or main building entrance, then a sign must be posted near the building entrance indicating the location of the parking facilities.

RESPONSE: The bicycle parking is proposed at the entrance of the Office and the entrance to Building B.

B. Bicycle parking shall be designed to meet the following requirements:

1. When more than seven bicycle parking spaces are required, a minimum of 50 percent of the spaces shall be covered. All of the required bicycle spaces for schools, park-and-ride lots, congregate housing facilities, and multifamily dwellings shall be covered.

2. Cover for bicycle parking may be provided by building or roof overhangs, awnings, bicycle lockers, bicycle storage within buildings, or freestanding shelters.

RESPONSE: Eight of the proposed bike racks are protected from the weather by building awnings.

4. Required bicycle parking spaces shall be illuminated.

RESPONSE: Bike parking is illuminated by building mounted light fixtures.

5. Required bicycle parking areas shall be clearly marked and reserved for bicycle parking only.

RESPONSE: Bicycle parking will be clearly identified and visible from the rights-of-way.

6. Bicycle parking space dimensions and standards:

RESPONSE: As proposed, the bicycle racks are placed to meet all dimensional requirements of this code section. Please refer to the Site Plan.

Table 1015-2: Minimum Required Bicycle Parking Spaces

Land Use Category	Minimum Bicycle Parking Spaces ¹
Warehouses and industrial buildings without attached offices, automotive service uses such as service stations and tire stores, and businesses selling large items such as major appliances, furniture, cars, or boats (per 10,000 square feet of building area)	1

RESPONSE: A total of 13 bicycle parking spaces are required. 14 bicycle spaces are provided.

1015.04 Off-Street Loading Standards

A. No area shall be considered a loading berth unless it can be shown that the area is accessible and usable for that purpose, and has maneuvering area for vehicles.

D. The minimum off-street loading berths listed in Table 1015-3 are required.

RESPONSE: A total of 3 loading berths are required. A total of 6 are provided. Proposed loading spaces vary in dimension.

ZDO Section 1021
Solid Waste and Recycle Material Collection

1021.01 Applicable

Section 1021 applies to:

- A. Multifamily dwellings of five dwelling units or more; and
- B. Institutional, commercial, and industrial developments.

RESPONSE: This section applies to the project.

1021.03 General Standards

A. Pads: Compactors, containers, and drop boxes shall be located on a level Portland Cement concrete pad, a minimum four inches thick, at ground level or other location compatible with the local collection service franchisee's equipment at the time of construction. The pad shall be designed to discharge surface water runoff to avoid ponding.

RESPONSE: The recycling and trash area is located within Building B, in the SW corner of the building. Garbage and recycling will be rolled out for pick up.

B. Recycling and Solid Waste Service Areas:

RESPONSE: Trash and recycling containers will be rolled out to a designated pick up spot.

C. Special Wastes or Recyclable Materials:

1. Hazardous wastes defined in Oregon Revised Statutes 466.005 shall be located, prepared, stored, maintained, collected, transported, and disposed in a manner acceptable to the Oregon Department of Environmental Quality.

2. Containers used to store cooking oils, grease, or animal renderings for recycling or disposal shall not be located in the principal recyclable materials or solid waste storage areas. These materials shall be stored in a separate storage area designed for such purpose.

RESPONSE: No hazardous wastes, cooking oils or animal renderings will be produced for or allowed to be disposed off at this facility.

ZDO Section 1102
Design Review

1102.02 Submittal Requirements

In addition to the submittal requirements identified in Subsection 1307.07(C), an application for design review shall include:

A. A narrative describing the proposed use;

RESPONSE: A Narrative is included in this application submittal (Tab 2).

B. An engineering geologic study, if required pursuant to Section 1002, Protection of Natural Features, or 1003, Hazards to Safety;

RESPONSE: A Geotechnical Report is included in this application submittal (Tab 6).

C. Preliminary statements of feasibility, if required pursuant to Section 1006, Utilities, Street Lights, Water Supply, Sewage Disposal, Surface Water Management, and Erosion Control;

RESPONSE: Preliminary statements of feasibility are included in this application submittal. (Tab 7)

D. A transportation impact study, if required pursuant to Section 1007, Roads and Connectivity;

RESPONSE: A Transportation Impact Study is included in this application submittal. (Tab 4)

F. A vicinity map showing the location of the subject property in relation to adjacent properties, roads, bikeways, pedestrian access, utility access, and manmade or natural site features that cross the boundaries of the subject property;

RESPONSE: A vicinity maps is included on the Title Sheet.

G. An existing conditions map, drawn to a scale of not less than one inch equals 50 feet, showing:

RESPONSE: An Existing Conditions Plan is included in this application submittal.

H. A proposed site plan, drawn to a scale of not less than one inch equals 50 feet, showing:

RESPONSE: A Site Plan is included in this application submittal.

I. A grading plan, drawn to a scale of not less than one inch equals 50 feet, showing location and extent of proposed grading, general contour lines, slope ratios, slope stabilization proposals, and natural resources protection consistent with Sections 1002 and 1003;

RESPONSE: A Preliminary Grading Plan is included in this application submittal.

J. Architectural drawings, including:

RESPONSE: Building elevations and floor plans are included in this application submittal.

K. A general landscaping plan, drawn to a scale of not less than one inch equals 50 feet, showing the elements required on the proposed site plan and:

RESPONSE: A Landscape Plan is included in this application submittal.

Clackamas County Comprehensive Plan CLACKAMAS REGIONAL CENTER AREA DESIGN PLAN

INTRODUCTION

Moving Toward a Preferred Future

The Clackamas Regional Center area, comprising about 2,100 acres, is a vital and growing part of the County. It is a major hub for the residential and business communities in the southeast Portland metropolitan area. The area has grown rapidly as urban services have been provided, and is poised for even more growth. Forecasts indicate that there will be 36,500 jobs and 7,600 housing units within the study area by the year 2017. This will about double the amount present in 1994. As this change occurs over the next twenty years, the area is envisioned to transition to even more intensive uses, more mixes of land uses, better access for all modes of transportation and a more attractive visual character.

The Clackamas Regional Center Area Design Plan sets the framework for decision-making to meet the challenge of planning for growth and guiding the area to a preferred future identified by citizens, the business community, and public service providers.

The remainder of the Comprehensive Plan is applicable to the Clackamas Regional Center Area. The Clackamas Regional Center Area Design Plan describes the goals and policies that are specific to the Clackamas Regional Center Area. The Clackamas Regional Center Area Design Plan takes precedence where conflicts exist between it and the remainder of the Comprehensive Plan.

The area of application for the Clackamas Regional Center Area Design Plan is shown on Map X-CRC-1.

RESPONSE: The subject site is designated as a corridor in the Clackamas Regional Center Area Design Plan.

REGION 2040 GROWTH CONCEPT PLAN DESIGN TYPES

The Clackamas Regional Center Area Design Plan focuses on three design types identified in the Region 2040 Growth Concept Plan and Urban Growth Management Functional Plan: a regional center, segments of three corridors and a station community

Corridors

Corridors are less dense than regional centers and are intended to feature a high-quality pedestrian environment and convenient access to transit, while continuing to meet the needs of the automobile. The Corridors in the Clackamas Regional Center Area are designated as Regional Streets in the Region 2040 Functional Plan, and as such are expected to continue to support high levels of through and local vehicular traffic. The Corridor areas are expected to transition to higher densities through infill and redevelopment. Designated Corridors are 82nd Avenue, Johnson Creek Boulevard, and Sunnyside Road.

RESPONSE: The project site is identified a Corridor Commercial property.

III. CORRIDOR LAND USE POLICIES

1.0 Land uses in Corridors shall be planned to:

1.1 Provide for both employment and housing, including mixed use.

1.2 Emphasize providing for a high level of bus usage, with land uses and transportation facilities to support bus use.

1.3 Encourage and support pedestrian travel with supportive land uses, frequent street connections, and sidewalks and pedestrian-ways.

1.4 Provide for vehicular traffic and auto-oriented uses, while expanding the share of trips via transit and other modes.

RESPONSE: The project includes a residential element (duplex), and encourages pedestrian movement through the corner outdoor seating area located at the corner of SE Glenco Road and SE 82nd Avenue. This outdoor seating area will facilitate pedestrian use between the transit on 82nd Ave. and the residential areas immediately to the west of the project.

TROJAN STORAGE

HAPPY VALLEY, OR CLACKAMAS COUNTY

PROJECT DATA		SHEET INDEX
SITE DATA: ADDRESS: SE GLENCOE & SE 82ND AVE. HAPPY VALLEY, OR LEGAL DESCRIPTION: T12E R29 SEC.DD TAX LOT 100 ZONING: CC PROPOSED USE: SELF STORAGE FACILITY PROPOSED CONST. TYPE: TYPE II-B		ARCHITECTURAL PLANS A1 TITLE SHEET A2 SITE PLAN A3 ELEVATIONS A4 1ST LEVEL FLOOR PLANS A5 2ND LEVEL FLOOR PLANS A6 COLOR MATERIAL BOARD CIVIL PLANS C0.1 GENERAL NOTES C0.2 EXISTING CONDITIONS C0.3 DEMOLITION PLAN C1.0 SITE PLAN C2.0 GRADING PLAN C3.0 UTILITY PLAN LANDSCAPE PLANS L1.0 LANDSCAPE PLAN L2.0 LANDSCAPE DETAILS L2.1 IRRIGATION DETAILS L3.0 LANDSCAPE & IR SPECS. LIGHTING PLAN E1.0 PHOTOMETRIC SITE PLAN
OWNER / APPLICANT: TROJAN STORAGE ADDRESS: 1732 AVIATION BLVD. SUITE 217 REDONDO BEACH, CA 90278 CONTACT: BRETT HENRY TELEPHONE: 310.862.6437 EMAIL: bhenry@trojanstorage.com ARCHITECT: JORDAN ARCHITECTS, INC. ADDRESS: 131 CALLE IGLESIA, SUITE 100 SAN CLEMENTE, CA 92673 CONTACT: BRUCE JORDAN TELEPHONE: 949-388-8090 EMAIL: bjordan@jordanarchitects.com		
VICINITY MAP SUBJECT SITE 		
CIVIL ENGINEER AAI ENGINEERING, INC ADDRESS: 4875 SW GRIFFITH DR. BEAVERTON, OR 97005 CONTACT: DUSTIN ELMORE TELEPHONE: (503) 820-3030 EMAIL: dustino@aaieing.com		

BRETT HENRY
TROJAN STORAGE CLACKAMAS
CLACKAMAS COUNTY, OR

TITLE SHEET

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JOB NUMBER: 19-506
SCALE:
DATE: 02/14/2020

A1

jordan
ARCHITECTS, INC.
131 CALLE IGLESIA, SUITE 100
SAN CLEMENTE,
CA 92672-7511
Telephone: 949-388-8090
Fax: 949-388-8290



SITE DATA			
LOT AREA	132,124	SQ. FT.	
	3.03	ACRES	
TOTAL GROSS BLDG. AREA	129,104	SQ. FT.	
LOT COVERAGE	68,113	SQ. FT.	
	48.86%		
PROPOSED F.A.R.	0.98		
LANDSCAPE AREA REQUIREMENTS			
	REQUIRED	PROPOSED	
LANDSCAPE AREA (10% MIN)	13,212 S.F.	14,124 S.F.	
BASIS OF DESIGN			
	EXISTING	PROPOSED	
ZONE	CORRIDOR COMMERCIAL (CC)	CORRIDOR COMMERCIAL (CC)	
SETBACKS			
	REQUIRED	PROVIDED	
FRONTYARD SETBACK	MIN. 15 FT. MAX. 20 F.T.	MIN. 15 FT. MAX. 20 F.T.	
SIDEYARD SETBACK	15 FT.	15 FT.	
REAR SETBACK	0 F.T.	0 F.T.	
BUILDING AREA TABULATIONS (Square Feet)			
	SELF STORAGE	OFFICE/ RESIDENCE	TOTAL
OFFICE - 1ST LEVEL	0	1,024	1,024
DUPLEX - 2ND LEVEL		1,922	1,922
BLDG. A - SINGLE STORY	6,098	0	6,098
BLDG. B - 1ST LEVEL	28,170	0	28,170
BLDG. B - 2ND LEVEL	28,170	0	28,170
BLDG. C - 1ST LEVEL	31,760	0	31,760
BLDG. C - 2ND LEVEL	31,760	0	31,760
TOTAL AREA:	125,958	2,946	128,904
EST. NET STORAGE AREA =	82%		103,266 SQ. FT.
PARKING REQUIREMENTS			
	REQUIRED	PROVIDED	
PER SUBSECTION 1015.02 MIN. PARKING = 2 STALLS PER 1000 S.F. (FOR 50,000 S.F. OR LARGER)	26 STALLS	26 STALLS 5 STANDARD 21 PARALLEL	
12'X35' LOADING BERTHS	3 BERTHS	3 BERTHS	
BICYCLE PARKING	13 SPACES	13 SPACES	

BUILDING CONSTRUCTION TYPE: IIB
 OCCUPANCY CLASSIFICATION: S-1
 BUILDINGS ARE EQUIPPED THROUGHOUT WITH AUTOMATIC FIRE SFRINKLER SYSTEM IN ACCORDANCE WITH NFPA 13.

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 CLACKAMAS COUNTY, OR

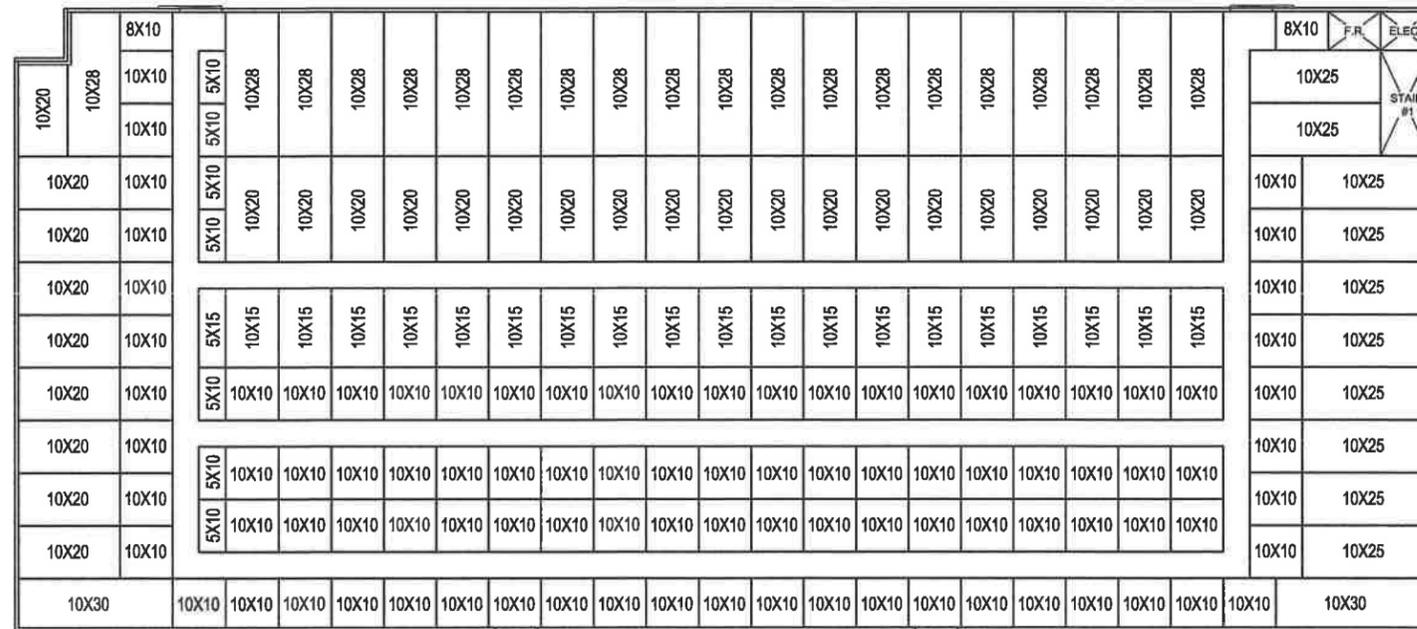
SCHEME H
PRELIM. SITE PLAN

JOB NUMBER: 19-506
 SCALE: 1"=20'-0"
 DATE: 02/14/2020

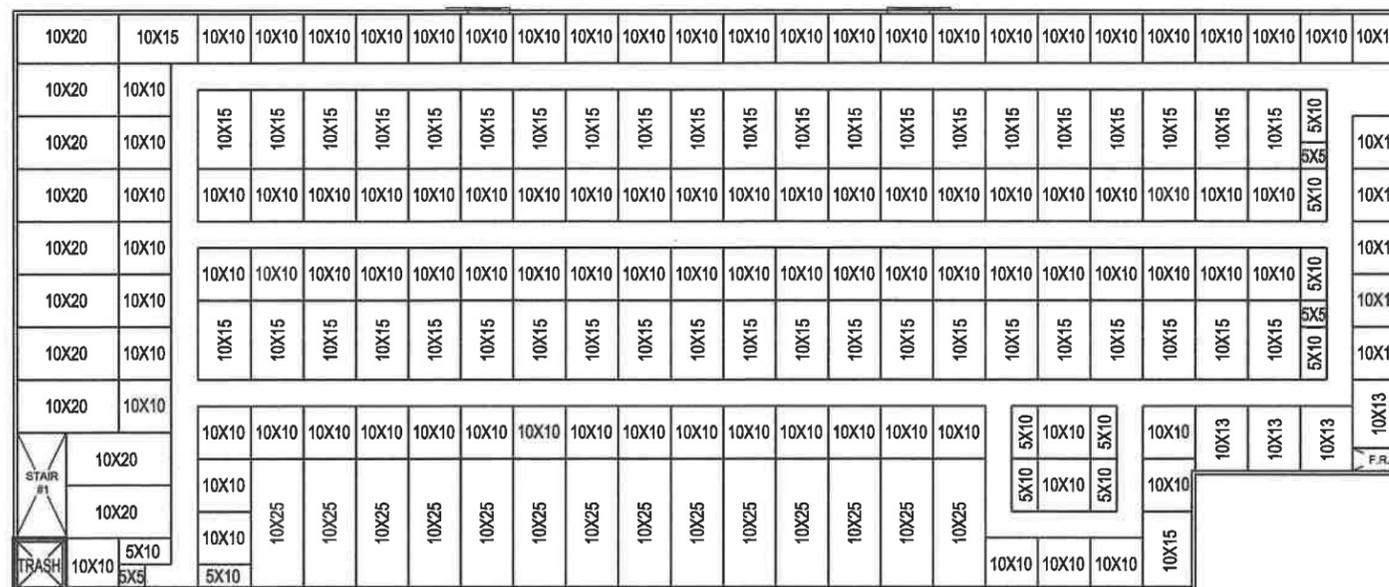
A2
 131 CALLE IGLESIA, SUITE 100
 SAN CLEMENTE,
 CA 92672-7541
 Telephone 949 388-8090
 Facsimile 949 388-8290



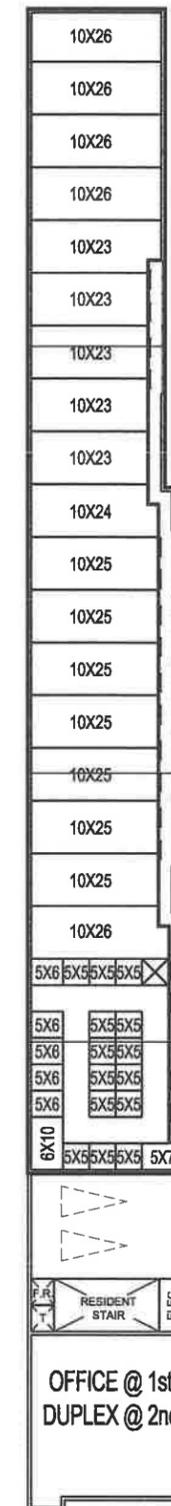
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BLDG. 'C' 1ST FLOOR PLAN 1/16"=1'-0" 2



BLDG. 'B' 1ST FLOOR PLAN 1/16"=1'-0" 3



BLDG. 'A' 1ST FLOOR PLAN 1/16"=1'-0" 4

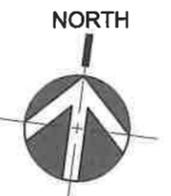
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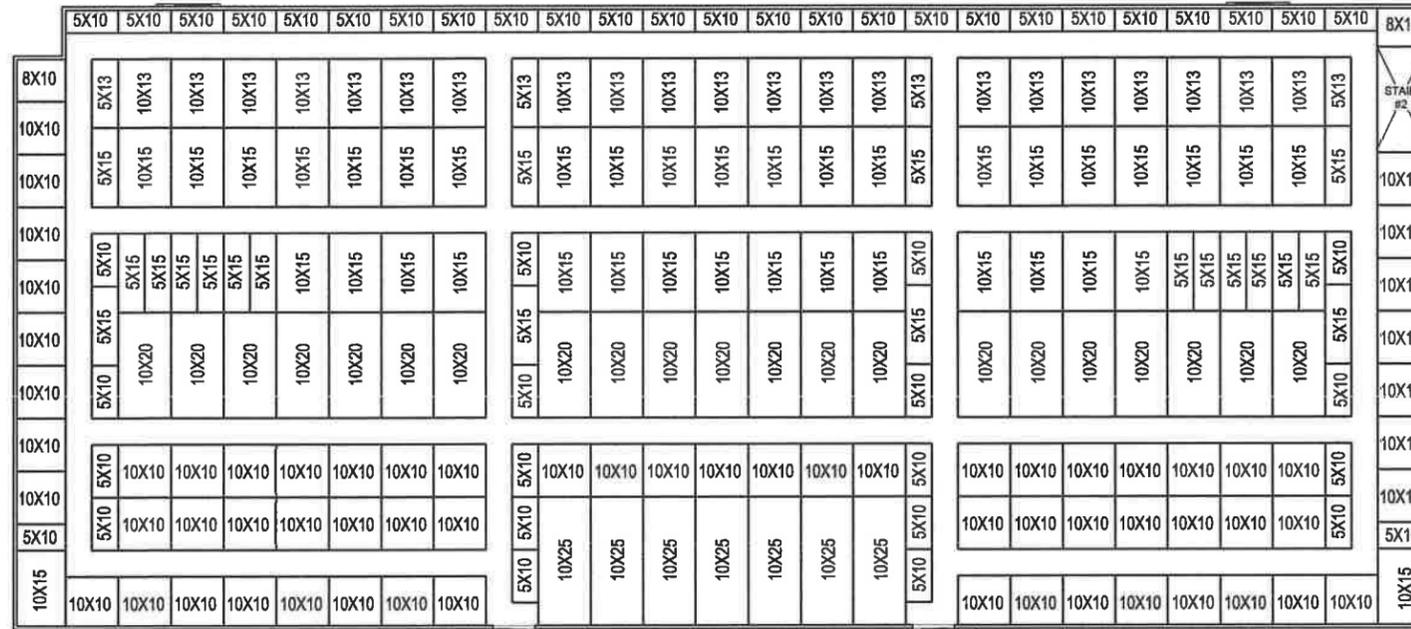
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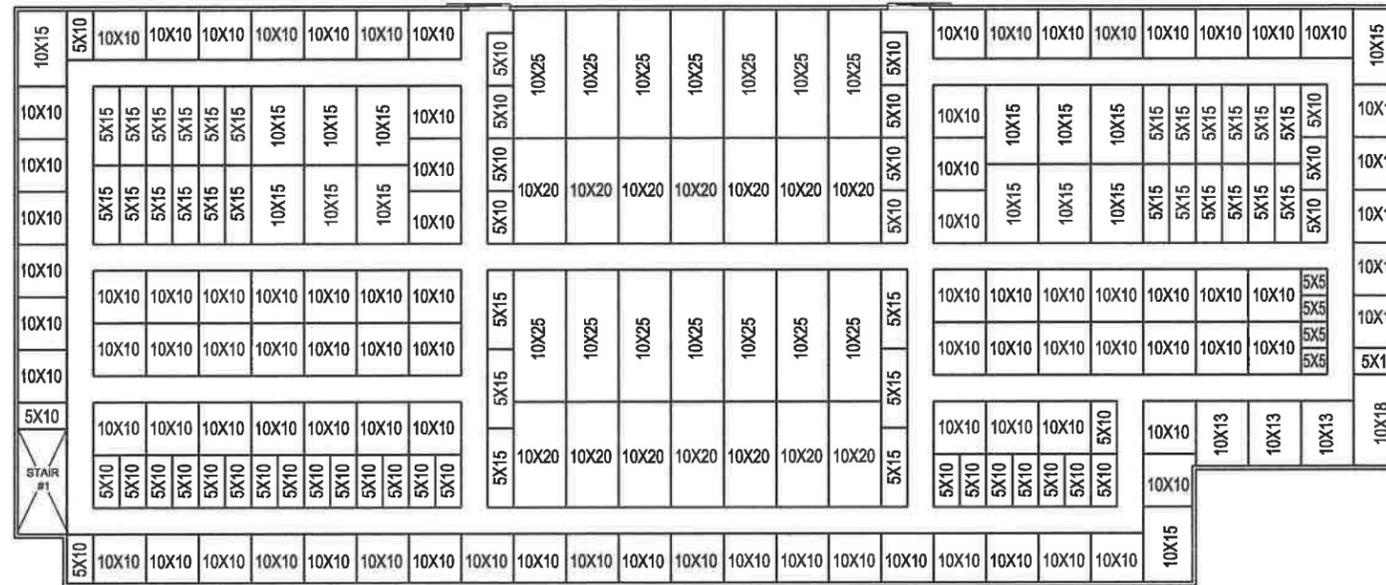
JOB NUMBER: 19-506
 SCALE: 1/16"=1'-0"
 DATE: 02/14/2020

A4





BLDG. 'C' 2ND FLOOR PLAN ①
1/16"=1'-0"



BLDG. 'B' 2ND FLOOR PLAN ②
1/16"=1'-0"

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 DATE: 02/14/2020

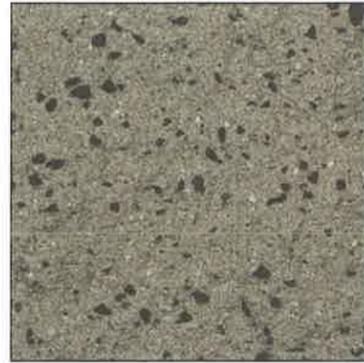
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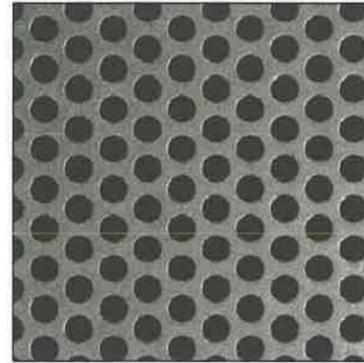
jordan
 ARCHITECTS, INC.
 131 CALLE IGLESIA, SUITE 100
 SAN CLEMENTE,
 CA 92672-7541
 Telephone: 949-366-8090
 Facsimile: 949-366-9200



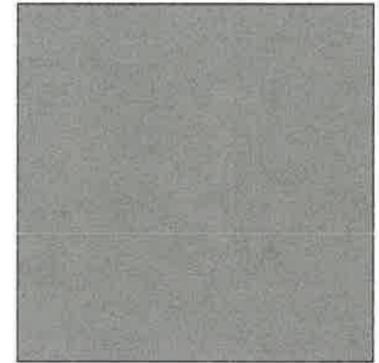
CMU
ORCO BLOCK -SPLIT FACE
COLOR: BLACK 250



CMU
ORCO BLOCK -SPLIT FACE
COLOR: COOL GRAY



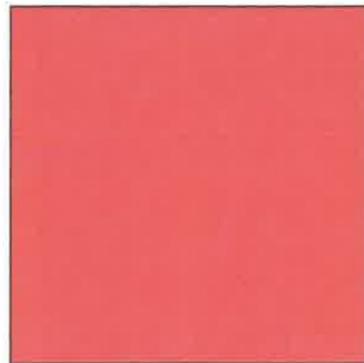
PERFORATED METAL
16 GUAGE BY McNICHOLS



STUCCO PAINT
DUNN EDWARDS
COLOR: DEC790
"ICE GRAY"



PAINT
DUNN EDWARDS
COLOR: DEA136
"BEAUTIFUL BLUE"



PAINT
DUNN EDWARDS
COLOR: DEA108
"POWER RED"



PAINT
DUNN EDWARDS
COLOR: DE6377
"BOAT ANCHOR"



ROLL-UP DOOR
JANUS INTERNATIONAL
COLOR: PATRIOT RED

BRETT HENRY
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CLACKAMAS COUNTY, OR

COLOR MATERIAL BOARD

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JOB NUMBER: 19-506
SCALE: N.T.S.
DATE: 02/14/2020

A6

GENERAL NOTES

1. CONSTRUCTION LAYOUT (ALL ACTUAL LINES AND GRADES) SHALL BE STAKED BY A PROFESSIONAL SURVEYOR, REGISTERED IN THE STATE OF OREGON, BASED ON COORDINATES, DIMENSIONS, BEARINGS, AND ELEVATIONS, AS SHOWN, ON THE PLANS.
2. PROJECT CONTROL SHALL BE FIELD VERIFIED AND CHECKED FOR RELATIVE HORIZONTAL POSITION PRIOR TO BEGINNING CONSTRUCTION LAYOUT.
3. PROJECT CONTROL SHALL BE FIELD VERIFIED AND CHECKED FOR RELATIVE VERTICAL POSITION BASED ON THE BENCHMARK STATED HEREON, PRIOR TO BEGINNING CONSTRUCTION LAYOUT.
4. WHEN DIMENSIONS AND COORDINATE LOCATIONS ARE REPRESENTED - DIMENSIONS SHALL HOLD OVER COORDINATE LOCATION. NOTIFY THE CIVIL ENGINEER OF RECORD IMMEDIATELY UPON DISCOVERY.
5. BUILDING SETBACK DIMENSIONS FROM PROPERTY LINES SHALL HOLD OVER ALL OTHER CALLOUTS. PROPERTY LINES AND ASSOCIATED BUILDING SETBACKS SHALL BE VERIFIED PRIOR TO CONSTRUCTION LAYOUT.
6. CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING MONUMENTATION DURING CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT OF ANY MONUMENTS DAMAGED OR REMOVED DURING CONSTRUCTION. NEW MONUMENTS SHALL BE REESTABLISHED BY A LICENSED SURVEYOR.
7. ALL CONSTRUCTION AND MATERIALS SHALL CONFORM TO THESE PLANS, THE PROJECT SPECIFICATIONS AND THE APPLICABLE REQUIREMENTS OF THE 2018 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, THE 2017 OREGON PLUMBING SPECIALTY CODE AND REQUIREMENTS OF THE CITY OF WILSONVILLE.
8. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE, AND LOCAL CODES, ORDINANCES AND REGULATIONS. ALL PERMITS, LICENSES AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES FOR THE EXECUTION AND COMPLETION OF WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING CONSTRUCTION.
9. ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS (503) 232-1987). EXCAVATORS MUST NOTIFY ALL PERTINENT COMPANIES OR AGENCIES WITH UNDERGROUND UTILITIES IN THE PROJECT AREA AT LEAST 48 BUSINESS-DAY HOURS, BUT NOT MORE THAN 10 BUSINESS DAYS PRIOR TO COMMENCING AN EXCAVATION, SO UTILITIES MAY BE ACCURATELY LOCATED.
10. THE LOCATION OF EXISTING UNDERGROUND UTILITIES SHOWN ON THE PLANS ARE FOR INFORMATION ONLY AND ARE NOT GUARANTEED TO BE COMPLETE OR ACCURATE. CONTRACTOR SHALL VERIFY ELEVATIONS, PIPE SIZE, AND MATERIAL TYPES OF ALL UNDERGROUND UTILITIES PRIOR TO COMMENCING WITH CONSTRUCTION AND SHALL BRING ANY DISCREPANCIES TO THE ATTENTION OF AAI ENGINEERING, 72 HOURS PRIOR TO START OF CONSTRUCTION TO PREVENT GRADE AND ALIGNMENT CONFLICTS.
11. THE ENGINEER OR OWNER IS NOT RESPONSIBLE FOR THE SAFETY OF THE CONTRACTOR OR HIS CREW. ALL O.S.H.A. REGULATIONS SHALL BE STRICTLY ADHERED TO IN THE PERFORMANCE OF THE WORK.
12. TEMPORARY AND PERMANENT EROSION CONTROL MEASURES SHALL BE IMPLEMENTED. THE CONTRACTOR SHALL ADHERE TO CITY OF WILSONVILLE FOR MINIMUM EROSION CONTROL MEASURES. THE ESC FACILITIES SHOWN IN THESE PLANS ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.
13. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL ROADWAYS, KEEPING THEM CLEAN AND FREE OF CONSTRUCTION MATERIALS AND DEBRIS, AND PROVIDING DUST CONTROL AS REQUIRED.
14. TRAFFIC CONTROL SHALL BE PROVIDED BY THE CONTRACTOR THROUGHOUT CONSTRUCTION. CONTRACTOR SHALL PROVIDE A TRAFFIC CONTROL PLAN TO CITY OF WILSONVILLE FOR REVIEW AND APPROVAL PRIOR TO COMMENCING CONSTRUCTION.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING AND SCHEDULING ALL WORK WITH THE OWNER.
16. NOTIFY CITY INSPECTOR 72 HOURS BEFORE STARTING WORK. A PRECONSTRUCTION MEETING WITH THE OWNER, THE OWNER'S ENGINEER, CONTRACTOR AND THE CITY REPRESENTATIVE SHALL BE REQUIRED.
17. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
18. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.
19. EXISTING SURVEY MONUMENTS ARE TO BE PROTECTED DURING CONSTRUCTION OR REPLACED IN ACCORDANCE WITH OREGON REVISED STATUTES 209.140 - 209.155.

CONSTRUCTION NOTES

DEMOLITION

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DEMOLITION AND DISPOSAL OF EXISTING AC, CURBS, SIDEWALKS AND OTHER SITE ELEMENTS WITHIN THE SITE AREA IDENTIFIED IN THE PLANS.
2. EXCEPT FOR MATERIALS INDICATED TO BE STOCKPILED OR TO REMAIN ON OWNER'S PROPERTY, CLEARED MATERIALS SHALL BECOME CONTRACTOR'S PROPERTY, REMOVED FROM THE SITE, AND DISPOSED OF PROPERLY.
3. ITEMS INDICATED TO BE SALVAGED SHALL BE CAREFULLY REMOVED AND DELIVERED STORED AT THE PROJECT SITE AS DIRECTED BY THE OWNER.
4. ALL LANDSCAPING, PAVEMENT, CURBS AND SIDEWALKS, BEYOND THE IDENTIFIED SITE AREA, DAMAGED DURING THE CONSTRUCTION SHALL BE REPLACED TO THEIR ORIGINAL CONDITION OR BETTER.
5. CONCRETE SIDEWALKS SHOWN FOR DEMOLITION SHALL BE REMOVED TO THE NEAREST EXISTING CONSTRUCTION JOINT.
6. SAWCUT STRAIGHT MATCHLINES TO CREATE A BUTT JOINT BETWEEN THE EXISTING AND NEW PAVEMENT.

UTILITIES

1. ADJUST ALL INCIDENTAL STRUCTURES, MANHOLES, VALVE BOXES, CATCH BASINS, FRAMES AND COVERS, ETC. TO FINISHED GRADE.
2. CONTRACTOR SHALL ADJUST ALL EXISTING AND/OR NEW FLEXIBLE UTILITIES (WATER, TV, TELEPHONE, ELEC., ETC.) TO CLEAR ANY EXISTING OR NEW GRAVITY DRAIN UTILITIES (STORM DRAIN, SANITARY SEWER, ETC.) IF CONFLICT OCCURS.
3. CONTRACTOR SHALL COORDINATE WITH PRIVATE UTILITY COMPANIES FOR THE INSTALLATION OF OR ADJUSTMENT TO GAS, ELECTRICAL, POWER AND TELEPHONE SERVICE.
4. BEFORE BACKFILLING ANY SUBGRADE UTILITY IMPROVEMENTS CONTRACTOR SHALL SURVEY AND RECORD MEASUREMENTS OF EXACT LOCATION AND DEPTH AND SUBMIT TO ENGINEER AND OWNER.

STORM AND SANITARY

1. CONNECTIONS TO EXISTING STORM AND SANITARY SEWERS SHALL CONFORM TO THE 2018 OREGON STANDARD SPECIFICATIONS FOR CONSTRUCTION, SECTION 00490, "WORK ON EXISTING SEWERS AND STRUCTURES".
2. BEGIN LAYING STORM DRAIN AND SANITARY SEWER PIPE AT THE LOW POINT OF THE SYSTEM, TRUE TO GRADE AND ALIGNMENT INDICATED WITH UNBROKEN CONTINUITY OF INVERT. THE CONTRACTOR SHALL ESTABLISH LINE AND GRADE FOR THE STORM AND SANITARY SEWER PIPE USING A LASER.
3. ALL ROOF DRAIN AND CATCH BASIN LEADERS SHALL HAVE A MINIMUM SLOPE OF 2 PERCENT UNLESS NOTED OTHERWISE IN THE PLANS.

WATER

1. ALL WATER AND FIRE PROTECTION PIPE SHALL HAVE A MINIMUM 36-INCH COVER TO THE FINISH GRADE.
2. ALL WATER AND FIRE PRESSURE FITTINGS SHALL BE PROPERLY RESTRAINED WITH THRUST BLOCKS PER DETAIL.
3. ALL WATER MAIN / SANITARY SEWER CROSSINGS SHALL CONFORM TO THE OREGON STATE HEALTH DEPARTMENT REGULATIONS, CHAPTER 333.

EARTHWORKS

1. CONTRACTOR SHALL PREVENT SEDIMENTS AND SEDIMENT LADEN WATER FROM ENTERING THE STORM DRAINAGE SYSTEM.
2. TRENCH BEDDING AND BACKFILL SHALL BE AS SHOWN ON THE PIPE BEDDING AND BACKFILL DETAIL, THE PROJECT SPECIFICATIONS AND AS REQUIRED IN THE SOILS REPORT. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER WILL NOT BE PERMITTED.
3. SUBGRADE AND TRENCH BACKFILL SHALL BE COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY AS DETERMINED BY ASTM D-698. FLOODING OR JETTING THE BACKFILLED TRENCHES WITH WATER IS NOT PERMITTED.

PAVING

1. SEE ARCHITECTURAL PLANS FOR SIDEWALK FINISHING AND SCORING PATTERNS.

MATERIAL NOTES

1. GENERAL: MATERIALS SHALL BE NEW. THE USE OF MANUFACTURER'S NAMES, MODELS, AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE, AND USEFULNESS. PROPOSED SUBSTITUTIONS WILL REQUIRE WRITTEN APPROVAL FROM ENGINEER PRIOR TO INSTALLATION.
2. STORM AND SANITARY SEWER PIPING SHALL BE PVC PIPE AS INDICATED IN THE PLANS. PIPES WITH LESS THAN 2' OF COVER SHALL BE C900/C905 PVC, HDPE OR DUCTILE IRON PIPE.
3. PRIVATE WATER MAINS 4-INCH DIAMETER AND LARGER SHALL BE DUCTILE IRON PIPE SCH 80; AS INDICATED IN THE PLANS.
4. PRIVATE WATER LINES 3-INCH DIAMETER AND SMALLER SHALL BE TYPE K COPPER OR PVC; AS INDICATED IN THE PLANS.
5. CONCRETE FOR CURBS, SIDEWALK AND DRIVEWAYS SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI AT 28 DAYS.

SEPARATION STATEMENT

ALL WATER MAIN CROSSINGS SHALL CONFORM TO THE OREGON STATE HEALTH DEPARTMENT, CHAPTER 333. WATER MAINS SHALL CROSS OVER SANITARY SEWERS WITH A 18" MINIMUM CLEARANCE BETWEEN OUTSIDE DIAMETERS OF PIPE WITH ALL PIPE JOINTS EQUIDISTANT FROM CROSSING. HORIZONTAL SEPARATION BETWEEN WATER MAINS AND SANITARY SEWERS IN PARALLEL INSTALLATIONS SHALL BE 10'. MAINTAIN 12" MINIMUM VERTICAL DISTANCE FOR ALL OTHER UTILITY CROSSINGS AND 12" HORIZONTAL PARALLEL DISTANCE. IN CASES WHERE IT IS NOT POSSIBLE TO MAINTAIN THE MINIMUM 10' HORIZONTAL SEPARATION, THE WATER MAIN SHALL BE LAID ON A SEPARATE SHELF IN THE TRENCH 18" INCHES ABOVE THE SEWER.



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TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE

GENERAL
NOTES

DATE: 11/04/19

DRAWN: DAR

CHECKED: DSE

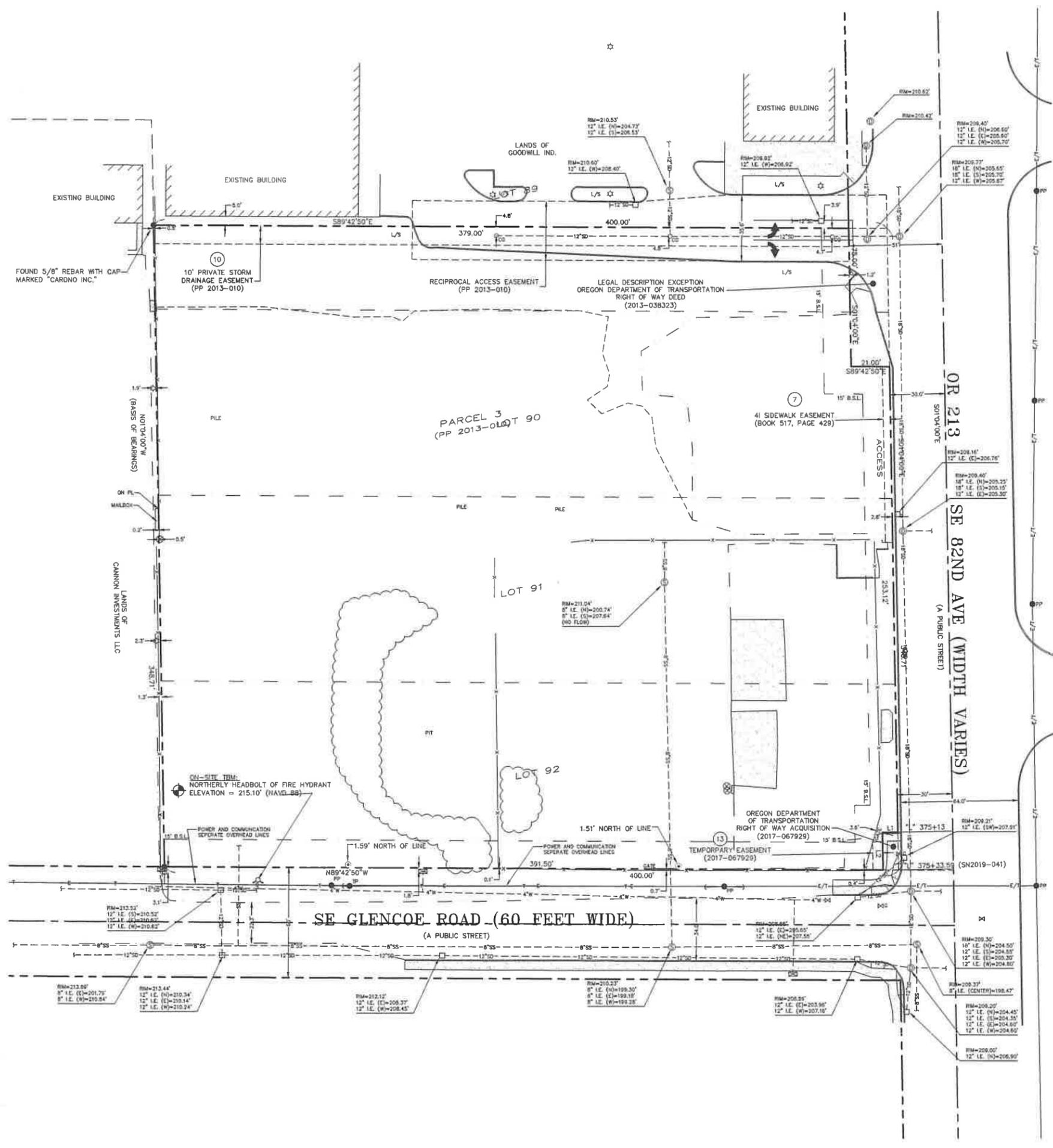
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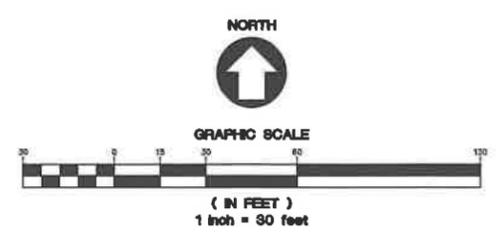
C0.1



SURVEY LEGEND

	PROPERTY LINE
	EASEMENT LINE
	B.S.L.
	BUILDING SETBACK LINE
	CENTERLINE
	BUILDING LINE
	6" CONCRETE CURB
	EDGE OF ASPHALT
	FENCE AS NOTED
	FENCE AS NOTED
	FENCE AS NOTED
	CONCRETE WALL
	CONCRETE SURFACE
	FIRE HYDRANT
	WATER METER
	WATER VALVE
	GAS VALVE
	SANITARY SEWER MANHOLE
	CLEAN OUT
	STORM SEWER MANHOLE
	CATCH BASIN
	POWER POLE
	POWER POLE WITH GUY WIRE
	TELECOMMUNICATION POLE
	LIGHT STANDARD
	ELECTRIC JUNCTION BOX
	BOLLARD
	FLAG POLE
	STOP SIGN
	RECORD BEARING AND/OR DISTANCE
	UNDERGROUND STORM DRAIN LINE
	UNDERGROUND SANITARY SEWER LINE
	UNDERGROUND WATER LINE
	UNDERGROUND GAS LINE
	UNDERGROUND ELECTRIC LINE
	UNDERGROUND FIBER OPTIC LINE
	OVERHEAD ELECTRIC/TELEPHONE LINE
	LANDSCAPED AREA
	L/S
	TRASH ENCLOSURE
	FOUND 5/8" REBAR WITH CAP MARKED "WRG DESIGN", OR AS NOTED
	FOUND 3/4" IRON PIPE

- ### SHEET NOTES
- POSTED PROPERTY ADDRESS: NO POSTED ADDRESS
 - BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE X, OF THE FLOOD INSURANCE RATE MAP NO. 41005C0029D WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
 - GROSS LAND AREA 137,871 SQUARE FEET OR 3.17 ACRES, MORE OR LESS.
 - THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE VISIBLE SURFACE FEATURES OF THE UTILITIES AND MARKINGS PROVIDED BY A 811 UTILITY LOCATE SERVICE PURSUANT TO SECTION 5.E.IV. AN EXACT LOCATION OF THESE UTILITIES WAS NOT PERFORMED FOR THIS SURVEY. BEFORE DIGGING, CALL THE APPROPRIATE LOCAL UTILITY LOCATE SERVICE FOR FIELD LOCATIONS OF UNDERGROUND UTILITY LINES.
 - AT THE TIME OF THE FIELD SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
 - PURSUANT TO TABLE A, ITEM 19, THERE ARE NO APPURTENANT EASEMENTS LISTED IN THE REFERENCED TITLE REPORT.
 - PHYSICAL ACCESS TO PROPERTY VIA PUBLIC RIGHTS OF WAY: SE 82ND AVENUE AND SE GLENCOE ROAD
 - EASEMENT RIGHTS: PLOTTABLE EASEMENTS ARE SHOWN FROM THE OWNER SUPPLIED TITLE REPORT. NON-PLOTTABLE EASEMENTS ARE NOTED ON THE SURVEY AS BEING "NOT PLOTTED". BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENT LOCATIONS, WE STRONGLY RECOMMEND LEGAL COUNSEL BE RETAINED TO REPORT ON TITLE PAPERS IN THEIR ENTIRETY.
 - BASIS OF BEARINGS: THE BEARING OF NORTH 01°04'00" WEST ALONG THE WESTERLY LINE OF PARCEL 3 AS SHOWN UPON THAT CERTAIN MAP ENTITLED "PARTITION PLAT NO. 2013-010" RECORDED AS DOCUMENT NO. 2013-023203, CLACKAMAS COUNTY RECORDS, WAS TAKEN AS THE BASIS OF BEARINGS SHOWN UPON THIS SURVEY.
 - THERE ARE NO GAPS, GORES OR OVERLAPS BETWEEN THE SUBJECT PROPERTY AND THE ADJOINING PROPERTIES OR PUBLIC STREET RIGHTS OF WAY SHOWN ON THIS SURVEY. THERE ARE NO INTERIOR GAPS, GORES OR OVERLAPS BETWEEN THE PARCELS WITHIN THE SUBJECT PROPERTY.
 - MAP AND TAX LOT NO. 12E29DD00190 AND 12E29DD00100.
 - THIS IS AN AS-BUILT SURVEY PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/NSPS LAND TITLE SURVEYS.
- VERTICAL DATUM: (NAVD 88)**
 BENCHMARK:
 CITY OF PORTLAND BENCHMARK NO.1216; FOUND BRASS DISK IN TOP OF CURB MARKED "CITY OF PORTLAND BENCHMARK NO. 1216" HAVING A PUBLISHED ELEVATION OF 201.252' (COP DATUM) CONVERTED TO (NAVD 88) USING THE CITY OF PORTLAND CONVERSION OF +2.10'; ELEVATION = 203.352' (NAVD 88)
- ON-SITE TEMPORARY BENCH MARK:**
 NORTHERLY HEAD BOLT OF FIRE HYDRANT NEAR THE SOUTHWESTERLY PROPERTY CORNER HAVING AN ELVATION OF 212.97' (NAVD 88)



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TROJAN STORAGE HAPPY VALLEY
 HAPPY VALLEY, OR

SHEET TITLE
 EXISTING CONDITIONS

DATE: 11/04/19
 DRAWN: DAR
 CHECKED: DSE
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SHEET NUMBER

C0.2

SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. CONTRACTOR MAY STAGE WITHIN LIMITS OF DEMOLITION.
3. REMOVE ALL SITE COMPONENTS AND RECYCLE COMPONENTS AS REQUIRED IN THE SPECIFICATIONS.
4. ALL TRADE LICENSES AND PERMITS NECESSARY FOR THE PROCUREMENT AND COMPLETION OF THE WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING DEMOLITION.
5. THE CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING RIGHT-OF-WAY SURVEY MONUMENTATION DURING DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT BY A LICENSED SURVEYOR OF ANY DAMAGED OR REMOVED MONUMENTS.
6. PROTECT ALL ITEMS ON ADJACENT PROPERTIES AND IN THE RIGHT OF WAY INCLUDING BUT NOT LIMITED TO SIGNAL EQUIPMENT, PARKING METERS, SIDEWALKS, STREET TREES, STREET LIGHTS, CURBS, PAVEMENT AND SIGNS. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ANY DAMAGED ITEMS TO ORIGINAL CONDITION.
7. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, AND OTHER FACILITIES IMMEDIATELY ADJACENT TO EXCAVATIONS FROM DAMAGES CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT AND OTHER HAZARDS.
8. SAWCUT STRAIGHT LINES IN SIDEWALK, AS NECESSARY.
9. CONTRACTOR IS RESPONSIBLE TO CONTROL DUST AND MUD DURING THE DEMOLITION PERIOD, AND DURING TRANSPORTATION OF DEMOLITION DEBRIS. ALL STREET SURFACES OUTSIDE THE CONSTRUCTION ZONE MUST BE KEPT CLEAN.
10. PROTECT ALL EXISTING UTILITY STRUCTURES AND UNDERGROUND MAINS TO REMAIN.
11. PROTECT ALL EXISTING VEGETATION TO REMAIN.

X PROTECTION NOTES

- 1 PROTECT EXISTING FENCE
- 2 PROTECT EXISTING LIGHT POLE
- 3 PROTECT EXISTING UTILITY STRUCTURE
- 4 PROTECT EXISTING WALL
- 5 PROTECT EXISTING BUILDING
- 6 PROTECT EXISTING SIDEWALK
- 7 PROTECT EXISTING CURB
- 8 PROTECT EXISTING POWER POLE

X DEMOLITION NOTES

- 1 REMOVE EXISTING GRAVEL
- 2 REMOVE EXISTING FENCE
- 3 REMOVE EXISTING MANHOLE
- 4 REMOVE EXISTING SANITARY
- 5 RELOCATE EXISTING FIRE HYDRANT
- 6 REMOVE EXISTING CONCRETE
- 7 REMOVE EXISTING CURB
- 8 REMOVE EXISTING PUBLIC SIDEWALK
- 9 REMOVE EXISTING VEGETATION



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TROJAN STORAGE HAPPY VALLEY
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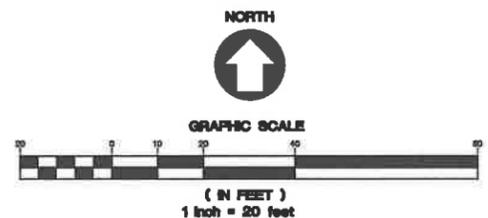
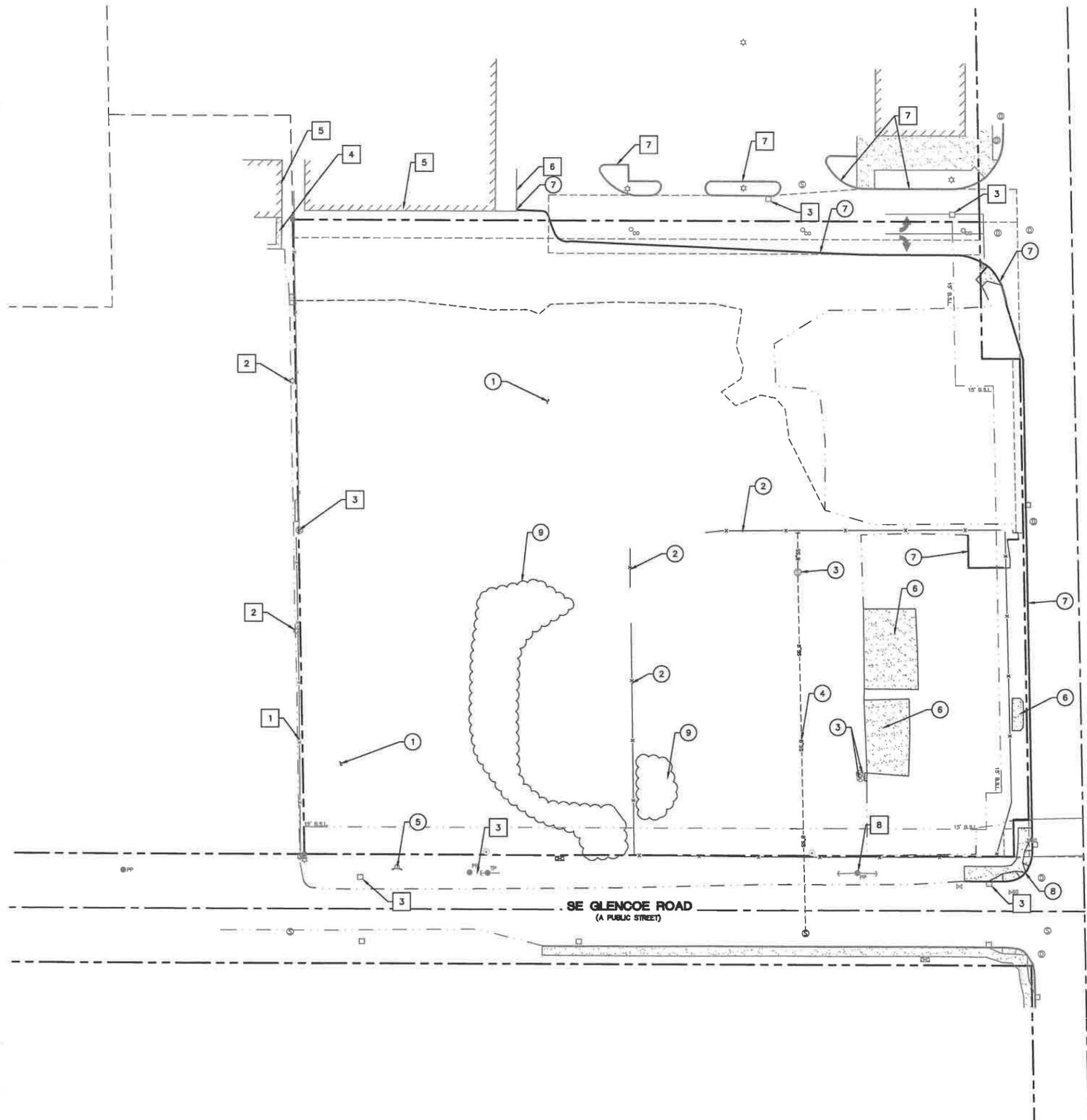
SHEET TITLE
DEMOLITION PLAN

DATE: 11/04/19
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 SHEET NUMBER

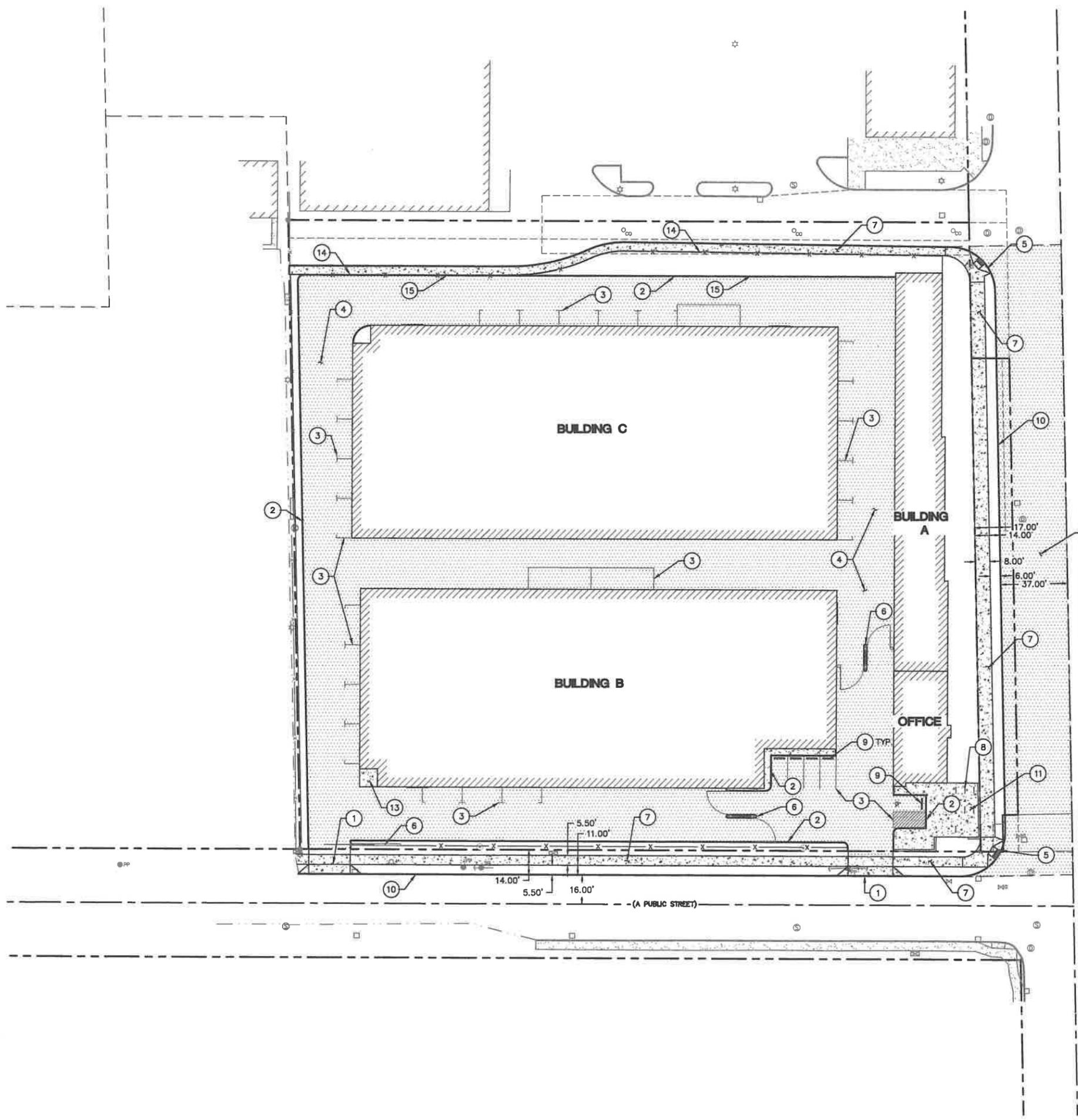
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JOB NUMBER: A19117.10



02/26/2019 - DR SUBMITTAL

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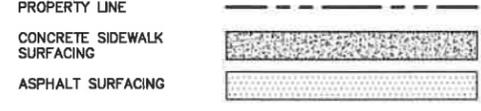
SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

- 1 INSTALL DRIVEWAY
- 2 INSTALL CONCRETE CURB
- 3 INSTALL STRIPING
- 4 INSTALL ASPHALT SURFACE
- 5 INSTALL PUBLIC ADA RAMP
- 6 INSTALL GATE
- 7 INSTALL PUBLIC SIDEWALK
- 8 INSTALL BIKE RACK
- 9 INSTALL WHEEL STOP
- 10 INSTALL PUBLIC CURB
- 11 INSTALL CONCRETE SURFACE
- 12 INSTALL PUBLIC ASPHALT
- 13 INSTALL TRASH ENCLOSURE, SEE ARCHITECTURAL PLANS FOR DETAIL
- 14 INSTALL FENCE
- 15 INSTALL CURB WALL

LEGEND



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TROJAN STORAGE HAPPY VALLEY
 HAPPY VALLEY, OR

SHEET TITLE

SITE PLAN

DATE: 11/04/19

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REVISIONS:

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SHEET NUMBER

C1.0

JOB NUMBER: A1917.10

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TROJAN STORAGE HAPPY VALLEY
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SHEET TITLE

GRADING PLAN

DATE: 11/04/19

DRAWN: DAR

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SHEET NUMBER

C2.0

JOB NUMBER: A19117.10

SHEET NOTES

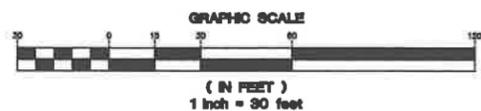
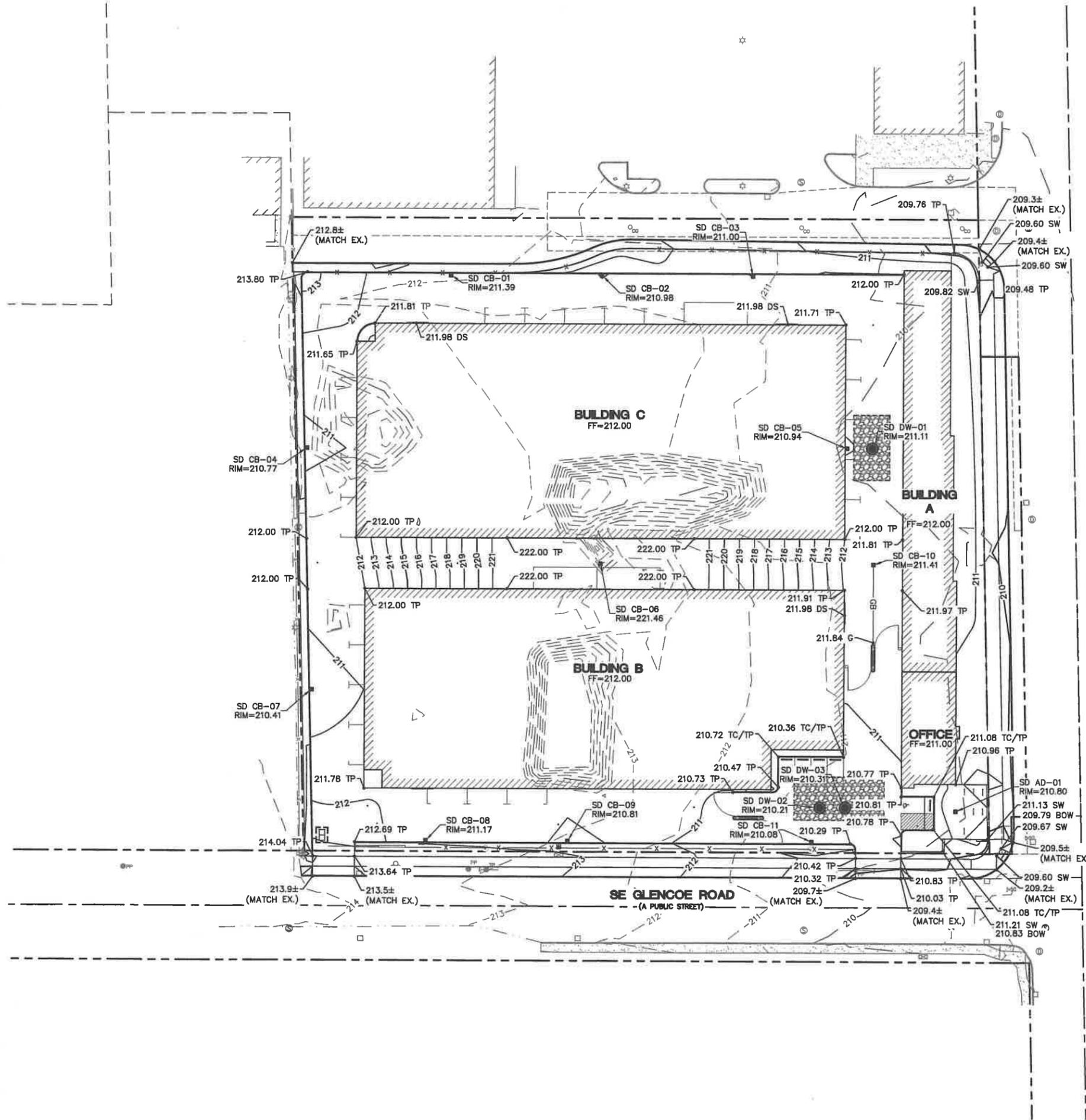
- SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
- CURB HEIGHTS ARE 6" UNLESS NOTED OTHERWISE.
- LANDINGS ON ACCESSIBLE ROUTES SHALL NOT EXCEED 2% IN ANY DIRECTION.
- ALL ACCESSIBLE ROUTES SHALL COMPLY WITH CURRENT ADA ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES (ADAAG).
- ALL WALKWAYS FROM ACCESSIBLE UNITS ARE DESIGNED TO NOT REQUIRE HANDRAILS. THEREFORE, RAMPS WITH SLOPES STEEPER THAN 5.0% AND LESS THAN 8.33% SHALL NOT EXCEED 0.5' RISE OR 6.0' LENGTH.
- FINISH GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT IN 10 FT OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT IN 10 FT AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL IN ROUGH GRADING.
- GRADING ELEVATIONS AS SHOWN ON SITE AND LANDSCAPE PLANS ARE FINISHED GRADE WHICH INCLUDES SUBGRADE SOIL, TOPSOIL, SOIL AMENDMENTS, ROCKERY AND RUNOFF PROTECTION CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND LANDSCAPE CONTRACTOR.

GRADING LABEL LEGEND

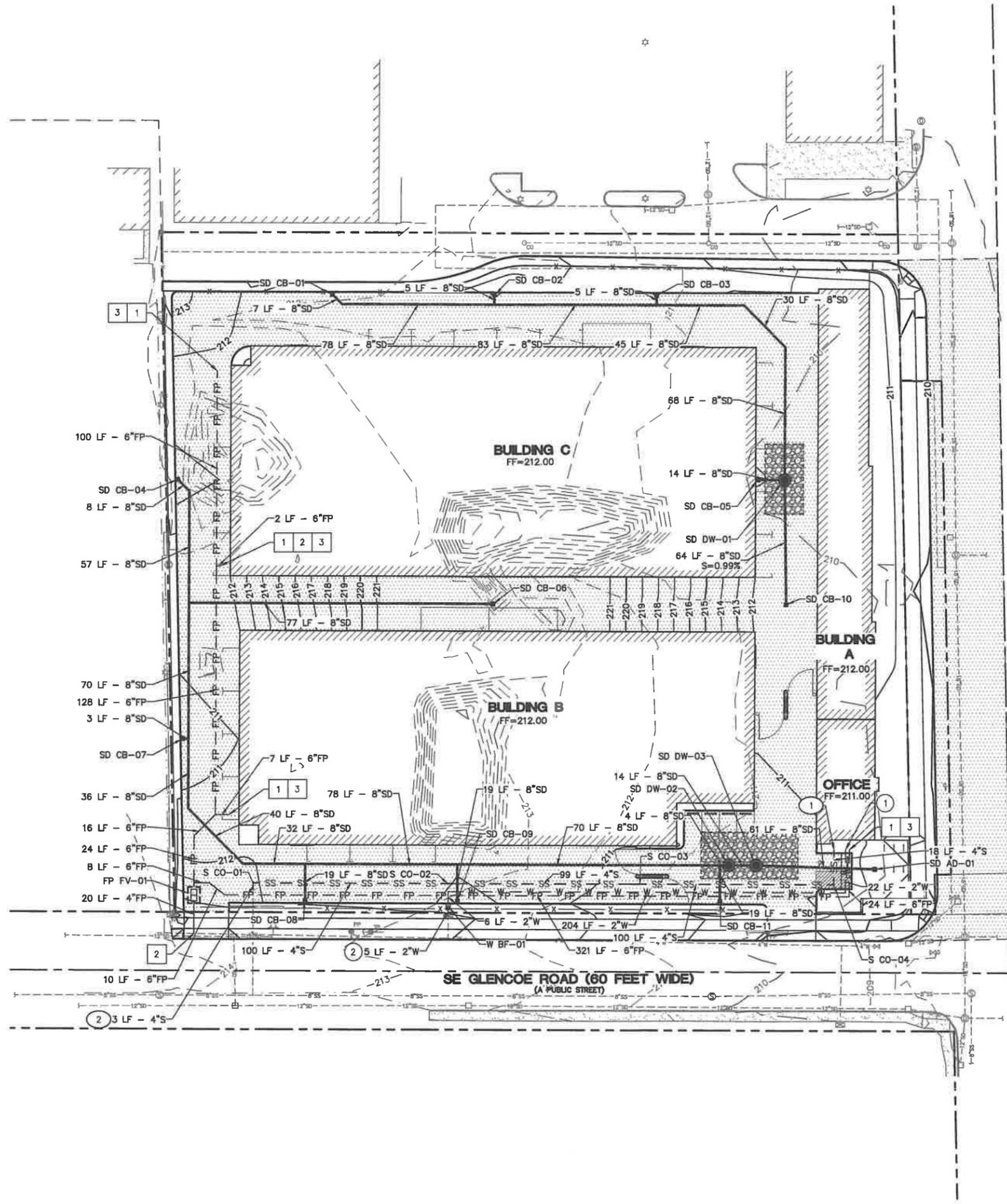
CALLOUT	DESCRIPTION
XX.XX XX	SPOT ELEVATION
	DESCRIPTION LISTED BELOW.
BOW	BOTTOM OF WALL
DS	DOOR SILL
EX	EXISTING GRADE
FF	FINISHED FLOOR ELEVATION
G	GROUND
SW	SIDEWALK
TC	TOP OF CURB
TP	TOP OF PAVEMENT

LEGEND

EXISTING CONTOUR MINOR	--- 102 ---
EXISTING CONTOUR MAJOR	--- 100 ---
PROPOSED CONTOUR MINOR	--- 102 ---
PROPOSED CONTOUR MAJOR	--- 100 ---
GRADE BREAK	--- GB --- GB ---



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(X) SANITARY NOTES

- 1 SEWER POINT OF CONNECTION TO BUILDING
- 2 INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
- 3 ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE

(X) WATER NOTES

- 1 WATER POINT OF CONNECTION TO BUILDING
- 2 CONNECT TO EXISTING WATER METER AND SERVICE TO BE MAINTAINED AND REUSED

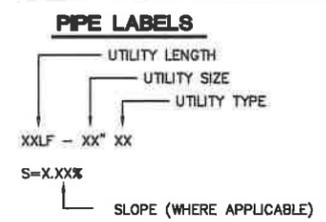
(X) FIRE WATER NOTES

- 1 FIRE WATER POINT OF CONNECTION TO BUILDING.
- 2 CONNECT TO EXISTING WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY SIZE AND LOCATION.
- 3 WALL MOUNTED FDC

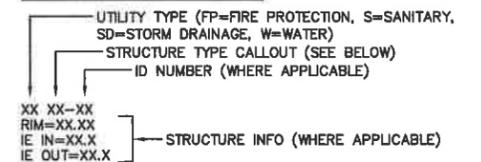
SHEET NOTES

1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
3. ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
4. THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
5. CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
6. DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
7. UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
8. INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
9. CONTRACTOR TO VERIFY SANITARY AND WATER SIZING WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.

LABEL LEGEND



STRUCTURE LABELS



STRUCTURE TYPES

CALLOUT	DESCRIPTION
AD	CATCH BASIN
DW	DRYWELL
FV	FIRE BACKFLOW VAULT
BF	DOMESTIC BACKFLOW ASSEMBLY

LEGEND

SANITARY SEWER LINE	SS — SS
WATER LINE	W — W — W
FIRE LINE	FP — FP — FP — FP
FDC LINE	FDC — FDC — FDC
STORM LINE	SD — SD — SD



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TROJAN STORAGE HAPPY VALLEY
HAPPY VALLEY, OR

SHEET TITLE

UTILITY PLAN

DATE: 11/04/19

DRAWN: DAR

CHECKED: DSE

REVISIONS:

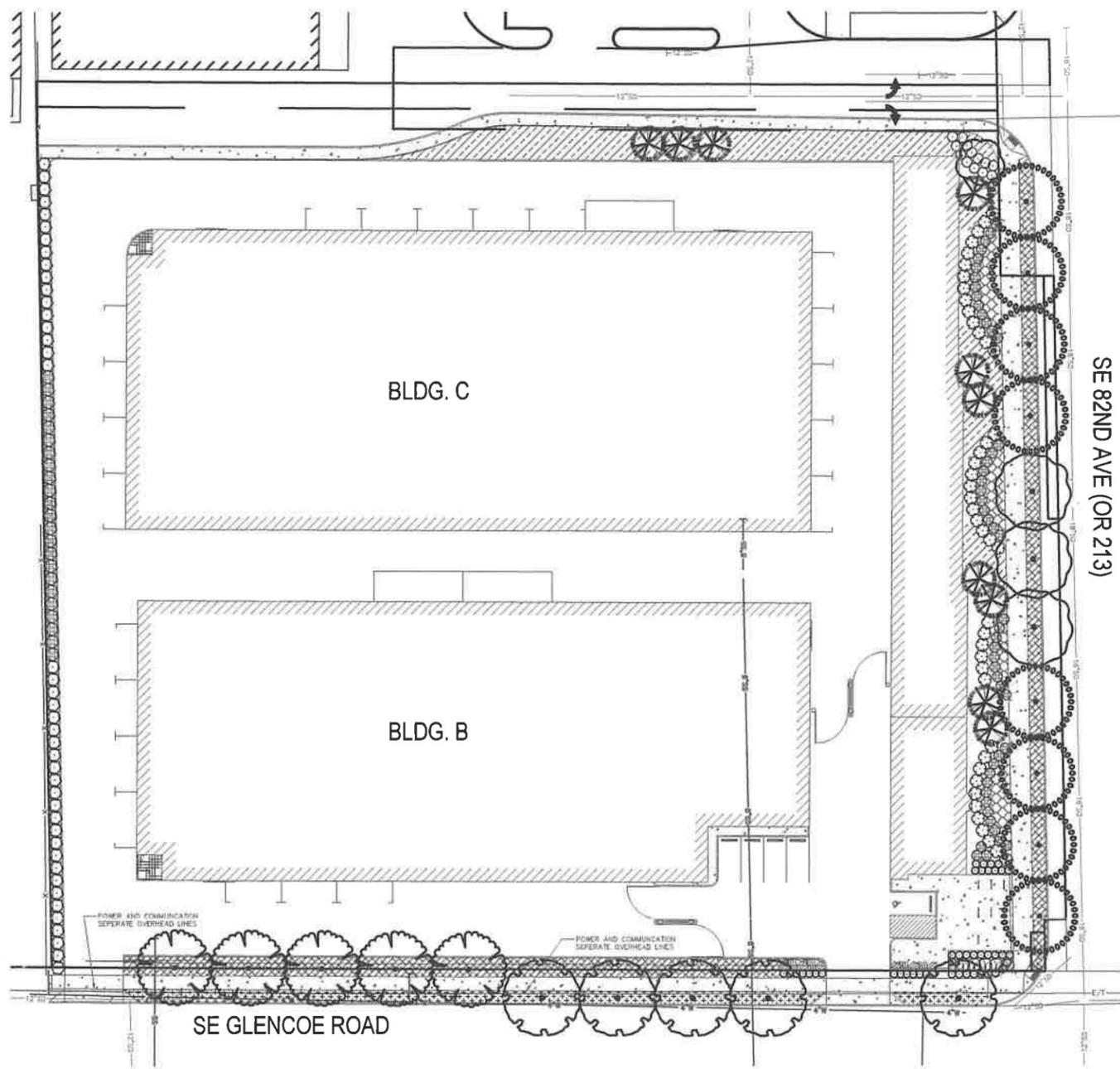
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SHEET NUMBER

C3.0

JOB NUMBER: A19117.10



PLANT SCHEDULE						
TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
	PR	1	PRUNUS X 'NEWPORT'	NEWPORT PLUM	2" CAL.	
EVERGREEN TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
	TH	10	THUJA PLICATA 'HOGAN' FULLY BRANCHED	HOGAN CEDAR	8' HT.	
STREET TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
	AP	3	ACER TRUNCATUM 'PACIFIC SUNSET' TM	PACIFIC SUNSET MAPLE	2" CAL.	
	PV	5	PARROTIA PERSICA 'VANESSA'	PERSIAN PARROTIA	2" CAL.	
	PC	5	PISTACIA CHINENSIS	CHINESE PISTACHE	2" CAL.	
	QC	8	QUERCUS COCCINEA	SCARLET OAK	2" CAL.	
SHRUBS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
	CY	5	COTINUS COGGYGRIA 'WINECRAFT BLACK'	DWARF SMOKE TREE	1 GAL.	
	EF	42	ESCALLONIA X EXONIENSIS 'FRADESII'	PINK ESCALLONIA	1 GAL.	
	LE	43	LOROPETALUM CHINENSE 'PIPA'S RED'	PIPA'S RED LOROPETALUM	1 GAL.	
	RP	6	RHODODENDRON YAKUSHIMANUM 'PERCY WISEMAN'	PERCY WISEMAN RHODODENDRON	1 GAL.	
	SG	49	SPIRAEA X BUMALDA 'GOLDFLAME'	GOLDFLAME SPIRAEA	1 GAL.	
	VO	7	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	1 GAL.	
	VS	24	VIBURNUM TINUS 'SPRING BOUQUET'	SPRING BOUQUET LAURESTINUS	1 GAL.	
GRASSES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
	PA	44	PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	1 GAL.	
GROUND COVERS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
	CW	954	COTONEASTER SALICIFOLIUS REPENS	WILLOWLEAF COTONEASTER	1 GAL.	24" o.c.
	FL	57	FRAGARIA CHILOENSIS 'LIPSTICK'	BEACH STRAWBERRY	1 GAL.	18" o.c.
	LP	24	LONICERA PILEATA	PRIVET HONEYSUCKLE	1 GAL.	36" o.c.
	MR	867	MAHONIA REPENS	CREEPING MAHONIA	1 GAL.	24" o.c.
	RE2	402	RUBUS CALYCINOIDES 'EMERALD CARPET'	EMERALD CARPET CREEPING RASPBERRY	1 GAL.	24" o.c.
	TM	46	TAXUS CUSPIDATA 'MONLOO'	EMERALD SPREADER JAPANESE YEW	1 GAL.	48" o.c.

TREE SUMMARY

TREES EXISTING = 1
 TREES TO BE REMOVED = 1

LANDSCAPE REQUIREMENTS

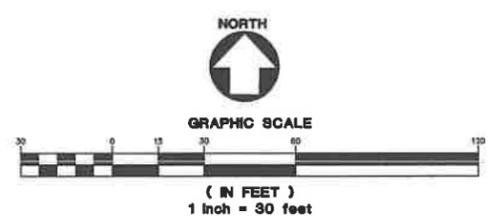
TOTAL SITE AREA = 132,124 SF
 LANDSCAPE AREA REQUIRED 10% OF SITE = 13,212 SF
 LANDSCAPE AREA PROPOSED = 11,526 SF
 PLUS PED. AMENITIES FOR LANDSCAPE AREA = 2,834 SF
 TOTAL LANDSCAPE AREA 10.66% = 14,360 SF

GENERAL NOTES

1. CONTRACTOR SHALL CONTACT LANDSCAPE ARCHITECT AT LEAST TWO WEEKS PRIOR TO START OF LANDSCAPE WORK TO REVIEW PLANT SUBSTITUTIONS & JURISDICTIONAL REQUIREMENTS.

PLANTING NOTES

- ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT CLACKAMAS COUNTY STANDARDS AND THE OREGON STRUCTURAL SPECIALTY CODE.
- VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION OF PROPERTY LINES, PRIOR TO BEGINNING ANY WORK. REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE IMMEDIATELY.
- DO NOT WILLFULLY PROCEED WITH CONSTRUCTION WHEN UNKNOWN OBSTRUCTIONS AND/OR DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. IMMEDIATELY NOTIFY OWNER'S REPRESENTATIVE OF UNKNOWN OBSTRUCTIONS AND/OR DIFFERENCES. PRIOR TO REMOVING ANY EXISTING FEATURES, REVIEW AND CONFIRM EXTENT OF DEMOLITION WITH OWNER'S REPRESENTATIVE.
- PROTECT EXISTING ITEMS TO REMAIN DURING CONSTRUCTION. ANY DAMAGE TO EXISTING ITEMS DESIGNATED TO REMAIN I.E. CURBS, WALKS, PLANT MATERIAL, LAWN OR FENCES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES, LINES, PIPES, VAULTS, OR BOXES PRIOR TO EXCAVATION. MARK AND PROTECT ALL UTILITIES, SITE FEATURES AND VEGETATION TO REMAIN IN PLACE. ANY DAMAGE TO ANY KNOWN EXISTING UTILITY ELEMENTS SHALL BE REPAIRED PROPERLY AND IMMEDIATELY.
- REMOVE FROM THE SITE AND LEGALLY DISPOSE OF ALL DEBRIS AND EXCAVATED MATERIAL NOT REQUIRED FOR FILL. NO RUBBISH OR DEBRIS SHALL BE BURIED ON THE SITE.
- MAINTAIN ALL ROADWAYS AND PAVED PATHWAYS CLEAN AND FREE OF CONSTRUCTION MATERIALS AND DEBRIS, PROVIDING NECESSARY DUST CONTROL WHERE REQUIRED.
- COORDINATE AND SCHEDULE ALL WORK WITH THE OWNER'S REPRESENTATIVE.
- INSTALL EROSION CONTROL SYSTEMS IN ACCORDANCE WITH CLACKAMAS COUNTY STANDARDS PRIOR TO SITE WORK AND LANDSCAPE INSTALLATION.
- CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND EROSION CONTROL.
- CONTRACTOR SHALL SUBMIT CERTIFIED TOPSOIL ANALYSIS REPORT FOR OWNER'S APPROVAL PRIOR TO PLANT INSTALLATION. SEE SPECS.
- CONTRACTOR IS RESPONSIBLE FOR ANY AMENDMENTS TO SOIL PH FERTILITY AND/OR DRAINAGE CONDITIONS NECESSARY TO ENSURE PROPER GROWING CONDITIONS FOR PROPOSED PLANTINGS. SEE SPECS.
- CONTRACTOR SHALL FOLLOW PROVIDER'S INSTRUCTIONS AND RECOMMENDATIONS FOR SEEDING.
- ALL PLANTS SHALL BE INSTALLED ACCORDING TO AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1) AS WELL AS DETAIL DRAWINGS AND SPECIFICATIONS.
- ALL PLANTS SHALL BE IRRIGATED BY A FULLY AUTOMATED, PERMANENT IRRIGATION SYSTEM UNLESS OTHERWISE NOTED. SEE SPECS.
- CONTRACTOR SHALL INSTALL RAIN SENSORS AS PER MANUFACTURER'S INSTRUCTIONS AND RECOMMENDATIONS. VERIFY THE LOCATION WITH THE OWNER PRIOR TO INSTALLATION.
- CONTRACTOR SHALL DESIGN THE IRRIGATION SYSTEM AND PROVIDE OWNER WITH SHOP DRAWINGS FOR APPROVAL. SEE SPECS.
- PRIOR TO FINAL ACCEPTANCE, CONTRACTOR SHALL PROVIDE OWNER WITH AS-BUILT PLANS OF THE INSTALLATION, COPIES OF ALL OPERATION MANUALS AND WARRANTY DOCUMENTS.
- ALL NEW PLANTS IN LANDSCAPE AREAS SHALL BE WARRANTED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.



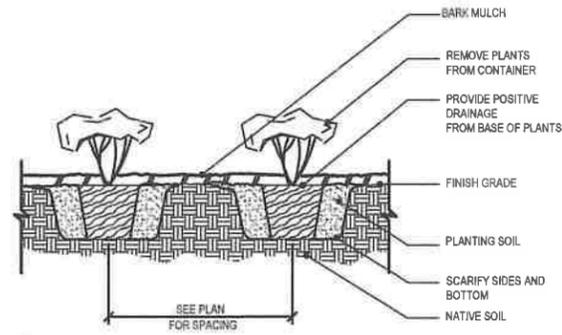
TROJAN STORAGE
 HAPPY VALLEY
 HAPPY VALLEY, OR

SHEET TITLE
LANDSCAPE PLAN

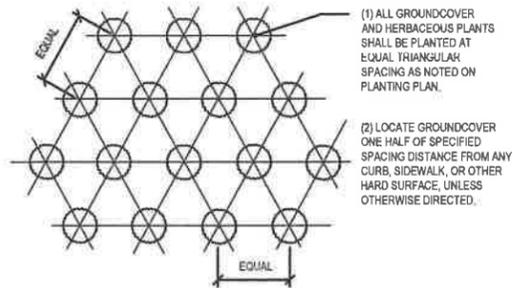
DATE: 11/04/19
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 SHEET NUMBER

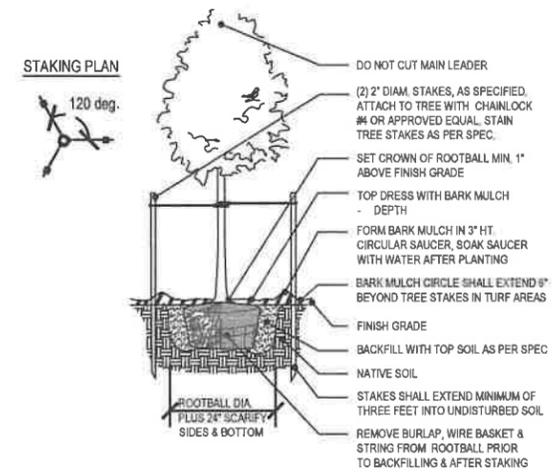
L1.0
 JOB NUMBER: A19117.10



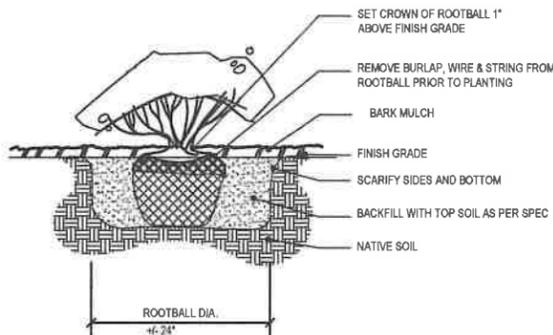
1 GROUNDCOVER & HERBACEOUS PLANT PLANTING DETAIL
L2.0 SCALE: NTS



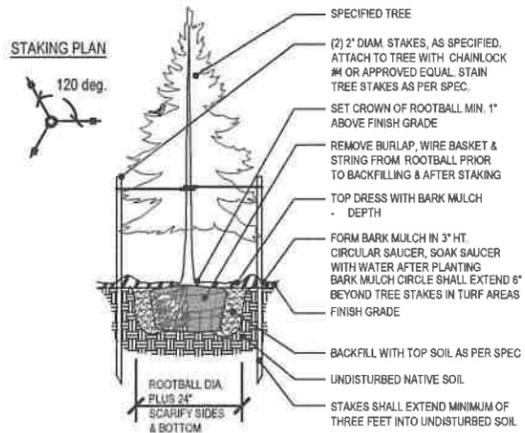
2 GROUNDCOVER & HERBACEOUS PLANT PLANTING PLAN
L2.0 SCALE: NTS



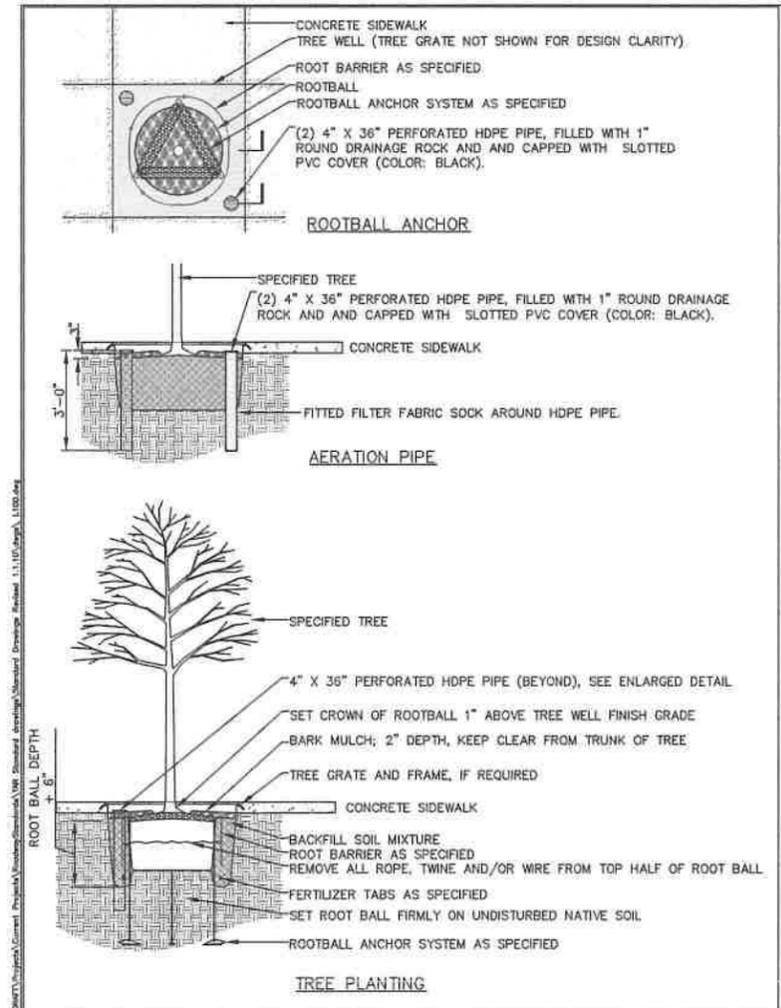
3 DECIDUOUS TREE PLANTING DETAIL
L2.0 SCALE: NTS



4 SHRUB PLANTING
L2.0 SCALE: NTS



5 CONIFER TREE PLANTING DETAIL
L2.0 SCALE: NTS



REVISION	DATE	BY

DEPARTMENT OF TRANSPORTATION AND DEVELOPMENT 150 BEAVERCREEK ROAD OREGON CITY, OR 97045		APPROVAL DATE: 1/1/10 SCALE: N.T.S. STANDARD DRAWING
---	--	--

TREE PLANTING DETAILS L100



Trojan Storage Happy Valley
PRELIMINARY STORMWATER REPORT & CALCULATIONS

SE 82nd Ave and SE Glencoe Rd
Happy Valley, Oregon

February 25, 2020
PROJECT NUMBER: A19117.10

John Megrditchian, PE
AAI Engineering
4875 S.W. Griffith Drive
Suite 300
Beaverton, Oregon
PH 503.352.688
FX 503.620.5539
EMAIL: johnm@aaing.com

RECEIVED

MAR 5 2020

**Clackamas County
Planning & Zoning Division**

Trojan Storage Happy Valley

Table of Contents

I.	Project Summary.....	A
II.	Stormwater Design	A
III.	Conveyance Calculations.....	B
IV.	Operations and Maintenance	B
VI.	Downstream Analysis	B
VII.	Engineering Conclusion	B

Appendices

Appendix A

Existing Conditions

Appendix B

Site Plan

Appendix C

Storm Plan and Details

Appendix D

Stormwater Calculation

Appendix E

Geotechnical Report

Appendix F

Operations and Maintenance Form

Trojan Storage Happy Valley

I. Project Summary

This report has been prepared to outline the existing and proposed on-site stormwater conditions for the Trojan Storage Happy Valley project. This report is based on topographic survey and a geotechnical report.

The site is located at SE 82nd Ave and SE Glencoe Rd in Happy Valley, Oregon. The existing conditions of the site currently consist of roughly half pavement and building pad, and half meadow.

See Appendix A – Existing Conditions.

The project proposes construction of a new storage facility with associated parking and drive aisles. The total area of the project is 123,546 SF (2.84 AC). The project proposes a total of 113,500 SF (2.61 AC) of impervious area. All proposed impervious area will be collected and treated by proposed stormwater management facilities.

See Appendix B – Site Plan and Appendix C – Storm Plan and Details.

II. Stormwater Design

Onsite stormwater will be managed in accordance with CCSD#1 Stormwater Standards dated July 1, 2013.

The onsite stormwater is divided into 2 basins. Both basins will convey stormwater from roof drains and catch basins into one of two drywell and rock storage detention/infiltration systems. Per the Geotechnical letter dated August 5, 2019 (Appendix H) the infiltration capacity of the native soil at the site of proposed infiltration is 18 in/hr. By providing a factor of safety of 2, a design infiltration rate of 9 in/hr has been used in the design of the infiltration systems. Though WES standards only require detention and infiltration of runoff generated during a 2-year event, ODOT requires detention of the 10-year and 25-year storm. Due to the fact that onsite stormwater runoff will not be discharging into any existing public stormwater facilities, the onsite stormwater system has been sized to fully infiltrate up to and including the 100 year event.

See Appendix D – Stormwater Calculations and Appendix E – Geotechnical Report.

Water Quality is achieved as all runoff will be fully infiltrated. Per Oregon DEQ water from roofs and parking lots with less than 50 parking spaces can be piped directly to a drywell and this facility is authorized by rule.

Trojan Storage Happy Valley

III. Conveyance Calculations

Stormwater conveyance has been sized for the 100-yr storm event, which surpasses the WES standards.

See Appendix D – Stormwater Calculations *(to be provided at permit submittal)*.

IV. Operations and Maintenance

See Appendix F – Operations and Maintenance *(to be provided at permit submittal)*.

VI. Downstream Analysis

All runoff is managed onsite via infiltration. Because the proposed design will not contribute any runoff to the downstream conveyance system, analysis of downstream capacity is not applicable.

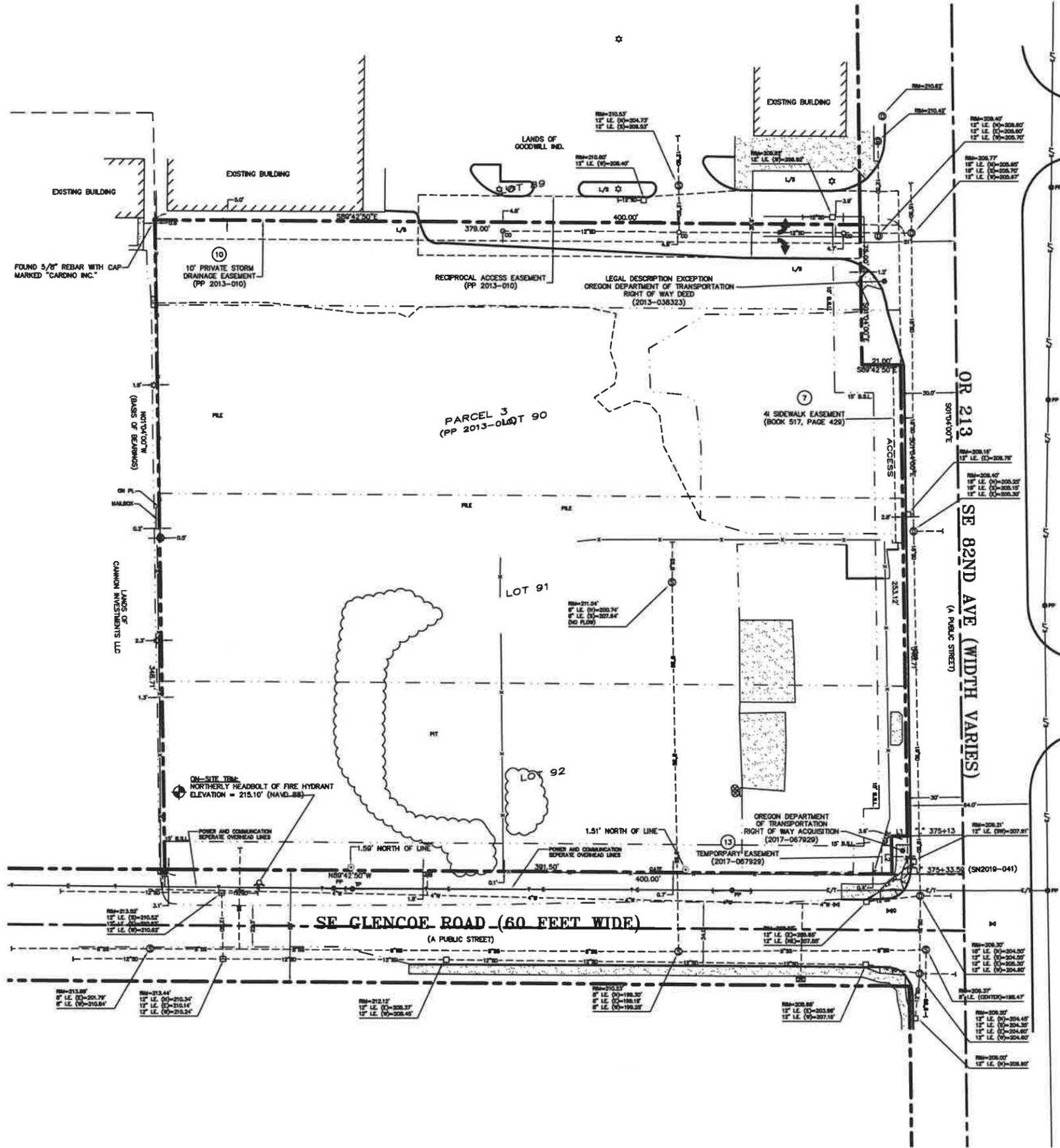
VII. Engineering Conclusion

Based on ODOT and WES requirements, the proposed site facilities will be adequately designed to manage the proposed development conditions and should be approved as designed.

Trojan Storage Happy Valley

Appendix A

Existing Conditions



SURVEY LEGEND

	PROPERTY LINE
	EASEMENT LINE
	BUILDING SETBACK LINE
	CENTERLINE
	BUILDING LINE
	6" CONCRETE CURB
	EDGE OF ASPHALT
	FENCE AS NOTED
	FENCE AS NOTED
	FENCE AS NOTED
	CONCRETE WALL
	CONCRETE SURFACE
	FIRE HYDRANT
	WATER METER
	WATER VALVE
	GAS VALVE
	SANITARY SEWER MANHOLE
	CLEAN OUT
	STORM SEWER MANHOLE
	CATCH BASIN
	POWER POLE
	POWER POLE WITH GUY WIRE
	TELECOMMUNICATION POLE
	LIGHT STANDARD
	ELECTRIC JUNCTION BOX
	BOLLARD
	FLAG POLE
	STOP SIGN
	RECORD BEARING AND/OR DISTANCE
	UNDERGROUND STORM DRAIN LINE
	UNDERGROUND SANITARY SEWER LINE
	UNDERGROUND WATER LINE
	UNDERGROUND GAS LINE
	UNDERGROUND ELECTRIC LINE
	UNDERGROUND FIBER OPTIC LINE
	OVERHEAD ELECTRIC/TELEPHONE LINE
	LANDSCAPED AREA
	TRASH ENCLOSURE
	FOUND 5/8" REBAR WITH CAP MARKED "WRG DESIGN", OR AS NOTED
	FOUND 3/4" IRON PIPE

- SHEET NOTES**
- POSTED PROPERTY ADDRESS: NO POSTED ADDRESS
 - BY GRAPHIC PLOTTING ONLY, THIS PROPERTY IS IN ZONE X, OF THE FLOOD INSURANCE RATE MAP NO. 41005C0020D WHICH BEARS AN EFFECTIVE DATE OF JUNE 17, 2008 AND IS NOT IN A SPECIAL FLOOD HAZARD AREA. NO FIELD SURVEYING WAS PERFORMED TO DETERMINE THIS ZONE AND AN ELEVATION CERTIFICATE MAY BE NEEDED TO VERIFY THIS DETERMINATION OR APPLY FOR A VARIANCE FROM THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
 - GROSS LAND AREA 137,871 SQUARE FEET OR 3.17 ACRES, MORE OR LESS.
 - THE UNDERGROUND UTILITIES SHOWN HEREON ARE BASED ON THE VISIBLE SURFACE FEATURES OF THE UTILITIES AND MARKINGS PROVIDED BY A 811 UTILITY LOCATE SERVICE PURSUANT TO SECTION 5.E.I.V. AN EXACT LOCATION OF THESE UTILITIES WAS NOT PERFORMED FOR THIS SURVEY. BEFORE DIGGING, CALL THE APPROPRIATE LOCAL UTILITY LOCATE SERVICE FOR FIELD LOCATIONS OF UNDERGROUND UTILITY LINES.
 - AT THE TIME OF THE FIELD SURVEY, THERE WAS NO OBSERVABLE EVIDENCE OF EARTH MOVING WORK, BUILDING CONSTRUCTION, OR BUILDING ADDITIONS WITHIN RECENT MONTHS.
 - PURSUANT TO TABLE A, ITEM 19, THERE ARE NO APPURTENANT EASEMENTS LISTED IN THE REFERENCED TITLE REPORT.
 - PHYSICAL ACCESS TO PROPERTY VIA PUBLIC RIGHTS OF WAY: SE 82ND AVENUE AND SE GLENCOE ROAD
 - EASEMENT RIGHTS: PLOTTABLE EASEMENTS ARE SHOWN FROM THE OWNER SUPPLIED TITLE REPORT. NON-PLOTTABLE EASEMENTS ARE NOTED ON THE SURVEY AS BEING "NOT PLOTTED". BECAUSE OUR SERVICE IS LIMITED TO REPORTING ON EASEMENT LOCATIONS, WE STRONGLY RECOMMEND LEGAL COUNSEL BE RETAINED TO REPORT ON TITLE PAPERS IN THEIR ENTIRETY.
 - BASIS OF BEARINGS: THE BEARING OF NORTH 01°04'00" WEST ALONG THE WESTERLY LINE OF PARCEL 3 AS SHOWN UPON THAT CERTAIN MAP ENTITLED "PARTITION PLAT NO. 2013-010" RECORDED AS DOCUMENT NO. 2013-023203, CLACKAMAS COUNTY RECORDS, WAS TAKEN AS THE BASIS OF BEARINGS SHOWN UPON THIS SURVEY.
 - THERE ARE NO GAPS, GORES OR OVERLAPS BETWEEN THE SUBJECT PROPERTY AND THE ADJOINING PROPERTIES OR PUBLIC STREET RIGHTS OF WAY SHOWN ON THIS SURVEY. THERE ARE NO INTERIOR GAPS, GORES OR OVERLAPS BETWEEN THE PARCELS WITHIN THE SUBJECT PROPERTY.
 - MAP AND TAX LOT NO. 12E29D000190 AND 12E29D000100.
 - THIS IS AN AS-BUILT SURVEY PREPARED IN ACCORDANCE WITH THE MINIMUM STANDARD DETAIL REQUIREMENTS FOR ALTA/MSPS LAND TITLE SURVEYS.
- VERTICAL DATUM: (NAVD 88)**
 BENCHMARK:
 CITY OF PORTLAND BENCHMARK NO.1216; FOUND BRASS DISK IN TOP OF CURB MARKED "CITY OF PORTLAND BENCHMARK NO. 1216" HAVING A PUBLISHED ELEVATION OF 201.252' (COP DATUM) CONVERTED TO (NAVD 88) USING THE CITY OF PORTLAND CONVERSION OF +2.10'; ELEVATION = 203.352' (NAVD 88)
- ON-SITE TEMPORARY BENCH MARK:**
 NORTHERLY HEAD BOLT OF FIRE HYDRANT NEAR THE SOUTHWESTERLY PROPERTY CORNER HAVING AN ELVATION OF 212.97' (NAVD 88)

DURYEA & ASSOCIATES
 Surveying and Mapping

TROJAN STORAGE HAPPY VALLEY

EXISTING CONDITIONS

DATE: 11/04/19
 DRAWN: DAR
 CHECKED: DSE
 REVISIONS:

GRAPHIC SCALE
 (IN FEET)
 1 inch = 80 feet

AAI alghan associates, inc.
ENGINEERING
 4875 SW Griffin Drive | Suite 300 | Beaverton, OR 97005
 503.620.3838 ext 1 | 503.620.3838 fax | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
 HAPPY VALLEY, OR

SHEET TITLE
 EXISTING CONDITIONS

DATE: 11/04/19
 DRAWN: DAR
 CHECKED: DSE
 REVISIONS:

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SHEET NUMBER
C0.2

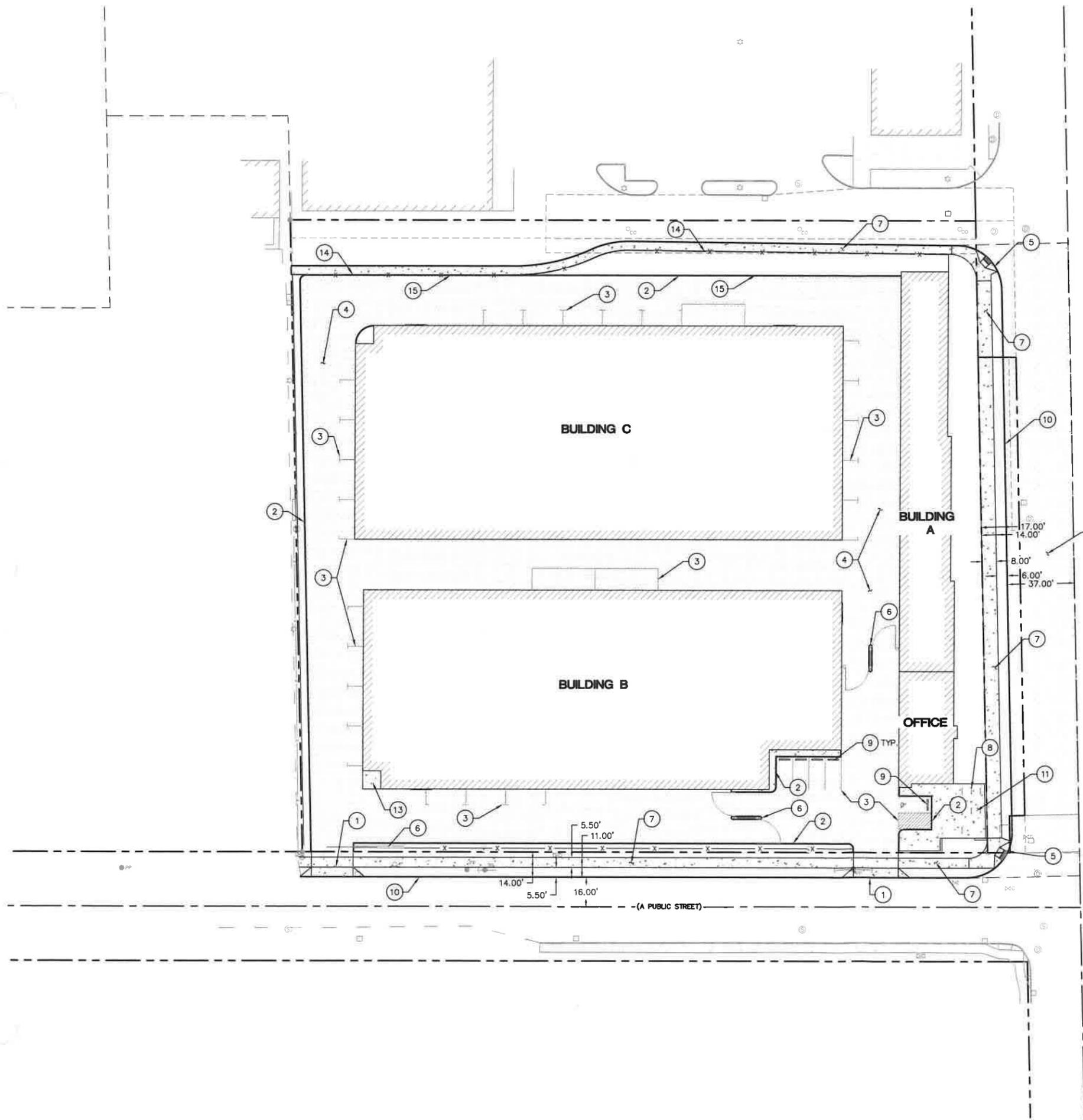
JOB NUMBER: A19117.10

Trojan Storage Happy Valley

Appendix B

Site Plan

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SHEET NOTES

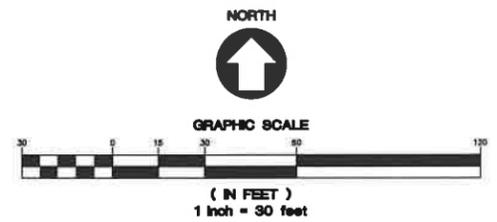
1. SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
2. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
3. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
4. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

- 1 INSTALL DRIVEWAY
- 2 INSTALL CONCRETE CURB
- 3 INSTALL STRIPING
- 4 INSTALL ASPHALT SURFACE
- 5 INSTALL PUBLIC ADA RAMP
- 6 INSTALL GATE
- 7 INSTALL PUBLIC SIDEWALK
- 8 INSTALL BIKE RACK
- 9 INSTALL WHEEL STOP
- 10 INSTALL PUBLIC CURB
- 11 INSTALL CONCRETE SURFACE
- 12 INSTALL PUBLIC ASPHALT
- 13 INSTALL TRASH ENCLOSURE, SEE ARCHITECTURAL PLANS FOR DETAIL
- 14 INSTALL FENCE
- 15 INSTALL CURB WALL

LEGEND

PROPERTY LINE	
CONCRETE SIDEWALK SURFACING	
ASPHALT SURFACING	



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 503.620.3030 | 503.620.3539 | www.aaieng.com

TROJAN STORAGE HAPPY VALLEY
 HAPPY VALLEY, OR

SHEET TITLE
 SITE PLAN

DATE: 11/04/19
 DRAWN: DAR
 CHECKED: DSE
 REVISIONS:

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 SHEET NUMBER

C1.0

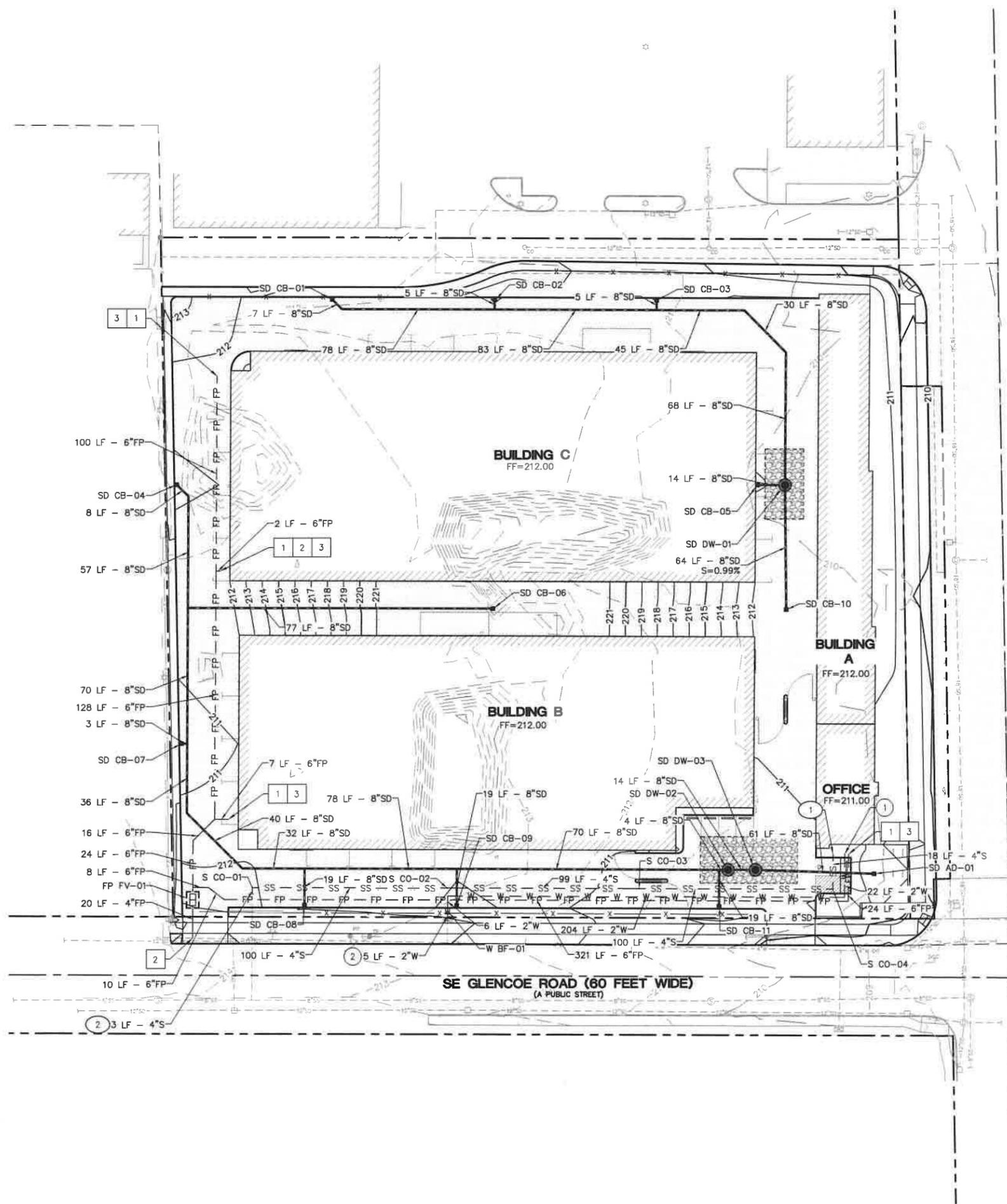
Trojan Storage Happy Valley

Appendix C

Storm Plan and Details

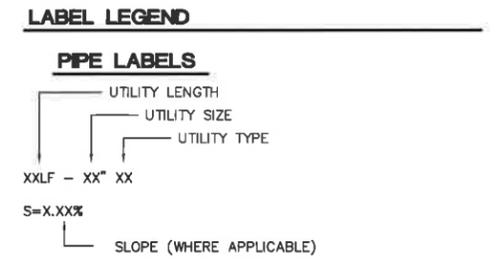
(Details will be provided at permit submittal)

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- SANITARY NOTES**
- SEWER POINT OF CONNECTION TO BUILDING
 - CONNECT TO EXISTING SEWER SERVICE TO BE MAINTAINED AND REUSED
- WATER NOTES**
- WATER POINT OF CONNECTION TO BUILDING
 - CONNECT TO EXISTING WATER METER AND SERVICE TO BE MAINTAINED AND REUSED
- FIRE WATER NOTES**
- FIRE WATER POINT OF CONNECTION TO BUILDING.
 - CONNECT TO EXISTING WATER MAIN. CONTRACTOR TO POTHOLE AND VERIFY SIZE AND LOCATION.
 - WALL MOUNTED FDC

- SHEET NOTES**
- SEE SHEET C0.1 FOR GENERAL SHEET NOTES.
 - INSTALL THRUST BLOCKS ON FIRE AND WATER LINES
 - ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
 - THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
 - CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
 - DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
 - UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
 - INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
 - CONTRACTOR TO VERIFY SANITARY AND WATER SIZING WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.

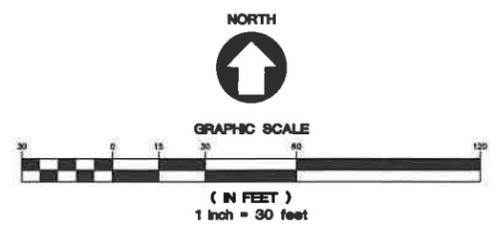


STRUCTURE TYPES

CALLOUT	DESCRIPTION
AD	CATCH BASIN
DW	DRYWELL
FV	FIRE BACKFLOW VAULT
BF	DOMESTIC BACKFLOW ASSEMBLY

LEGEND

SANITARY SEWER LINE	SS	SS
WATER LINE	W	W
FIRE LINE	FP	FP
FDC LINE	FDC	FDC
STORM LINE		



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TROJAN STORAGE HAPPY VALLEY

SHEET TITLE
UTILITY PLAN

DATE: 11/04/19
DRAWN: DAR
CHECKED: DSE

REVISIONS:

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SHEET NUMBER

C3.0

JOB NUMBER: A19117.10

Trojan Storage Happy Valley

Appendix D

Stormwater Calculations

(Conveyance calculations will be provided at permit submittal)



South System



Chambers



North System



Chambers



A19117.Trojan Storage Happy Valley

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Project Notes

Rainfall events imported from "A19221.10 HYDROCAD.hcp"

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Page 3

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.606	98	Paved parking, HSG C (22S, 25S)
2.606	98	TOTAL AREA

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Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
2.606	HSG C	22S, 25S
0.000	HSG D	
0.000	Other	
2.606		TOTAL AREA

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Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	2.606	0.000	0.000	2.606	Paved parking	22S, 25S
0.000	0.000	2.606	0.000	0.000	2.606	TOTAL AREA	

A19117.Trojan Storage Happy Valley

Type IA 24-hr 100 yr Rainfall=4.80"

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Page 6

Time span=0.00-30.00 hrs, dt=0.05 hrs, 601 points

Runoff by SBUH method, Split Pervious/Imperv.

Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 22S: North System

Runoff Area=43,800 sf 100.00% Impervious Runoff Depth=4.56"
Tc=5.0 min CN=0/98 Runoff=1.14 cfs 0.382 af

Subcatchment 25S: South System

Runoff Area=69,700 sf 100.00% Impervious Runoff Depth=4.56"
Tc=5.0 min CN=0/98 Runoff=1.81 cfs 0.609 af

Pond 26P: Chambers

Peak Elev=16.40' Storage=8,146 cf Inflow=1.81 cfs 0.609 af
Outflow=0.25 cfs 0.582 af

Pond 28P: Chambers

Peak Elev=18.29' Storage=5,421 cf Inflow=1.14 cfs 0.382 af
Outflow=0.15 cfs 0.351 af

Total Runoff Area = 2.606 ac Runoff Volume = 0.991 af Average Runoff Depth = 4.56"
0.00% Pervious = 0.000 ac 100.00% Impervious = 2.606 ac

Summary for Subcatchment 22S: North System

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.14 cfs @ 7.90 hrs, Volume= 0.382 af, Depth= 4.56"

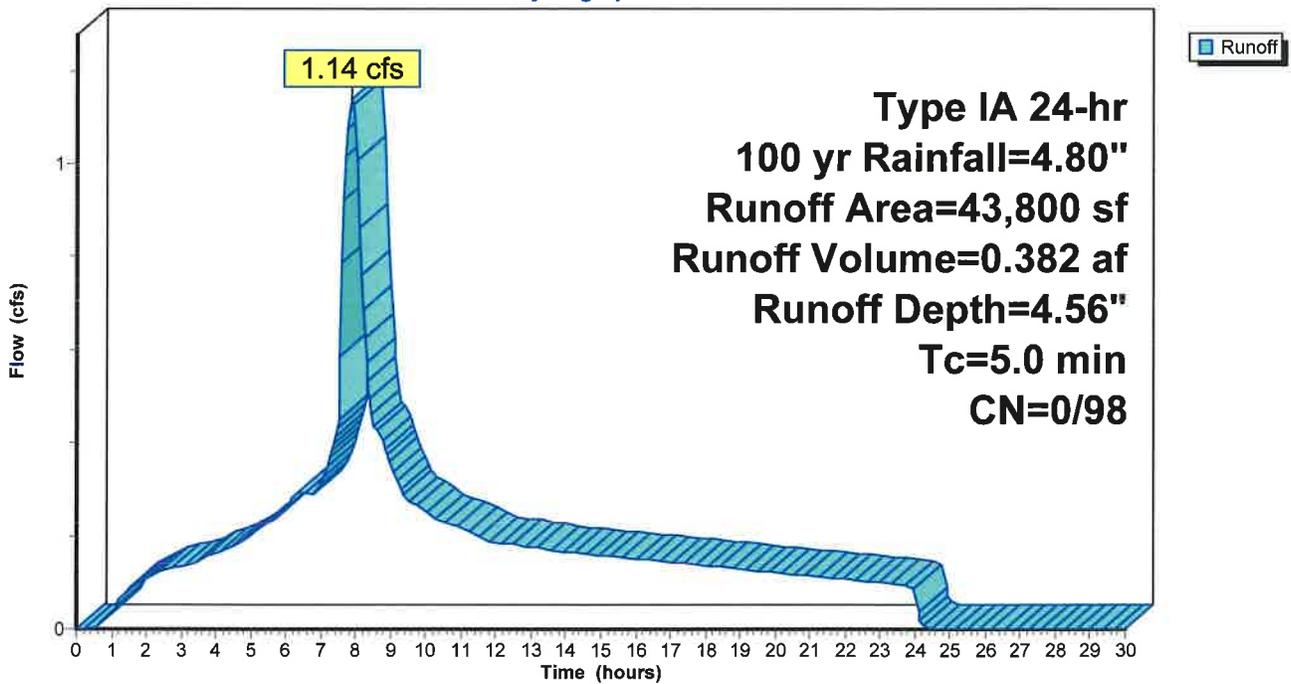
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 yr Rainfall=4.80"

Area (sf)	CN	Description
43,800	98	Paved parking, HSG C
43,800	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 22S: North System

Hydrograph



A19117.Trojan Storage Happy Valley

Type IA 24-hr 100 yr Rainfall=4.80"

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Summary for Subcatchment 25S: South System

[49] Hint: Tc<2dt may require smaller dt

Runoff = 1.81 cfs @ 7.90 hrs, Volume= 0.609 af, Depth= 4.56"

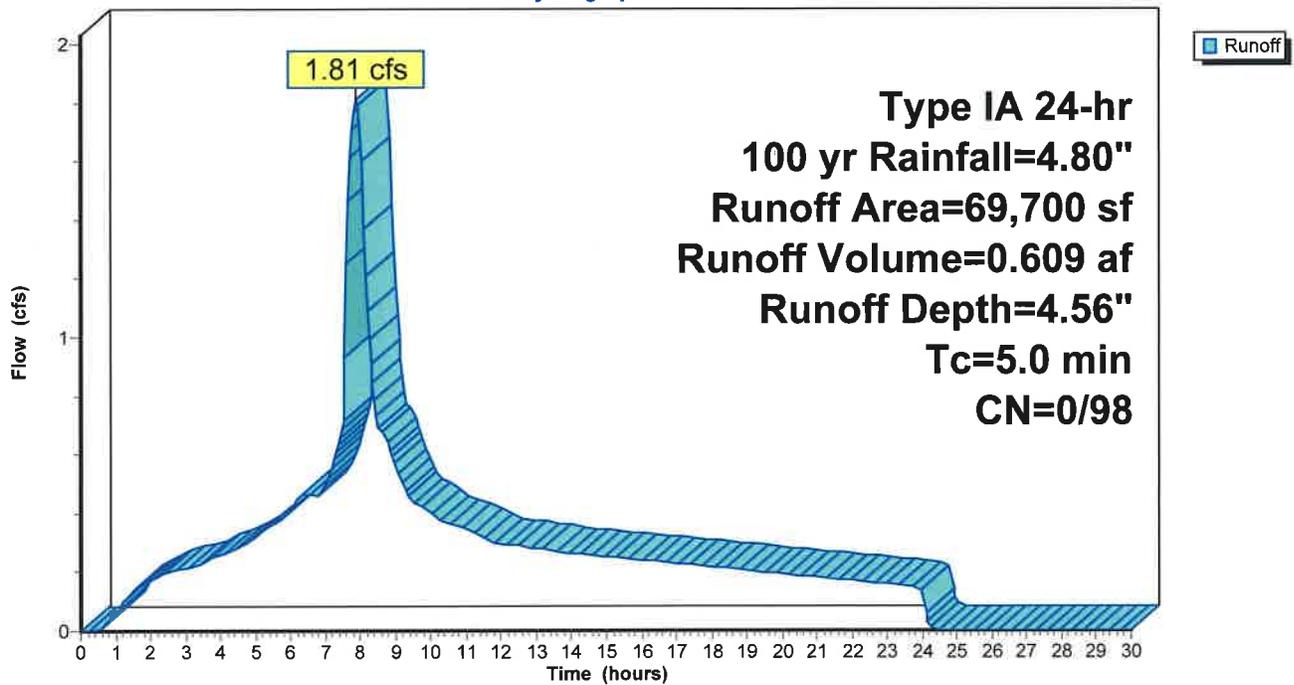
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100 yr Rainfall=4.80"

Area (sf)	CN	Description
69,700	98	Paved parking, HSG C
69,700	98	100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 25S: South System

Hydrograph



A19117.Trojan Storage Happy Valley

Type IA 24-hr 100 yr Rainfall=4.80"

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Summary for Pond 26P: Chambers

Inflow Area = 1.600 ac, 100.00% Impervious, Inflow Depth = 4.56" for 100 yr event
 Inflow = 1.81 cfs @ 7.90 hrs, Volume= 0.609 af
 Outflow = 0.25 cfs @ 3.95 hrs, Volume= 0.582 af, Atten= 86%, Lag= 0.0 min
 Discarded = 0.25 cfs @ 3.95 hrs, Volume= 0.582 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 16.40' @ 15.18 hrs Surf.Area= 1,200 sf Storage= 8,146 cf

Plug-Flow detention time= 331.0 min calculated for 0.582 af (96% of inflow)
 Center-of-Mass det. time= 298.3 min (955.0 - 656.7)

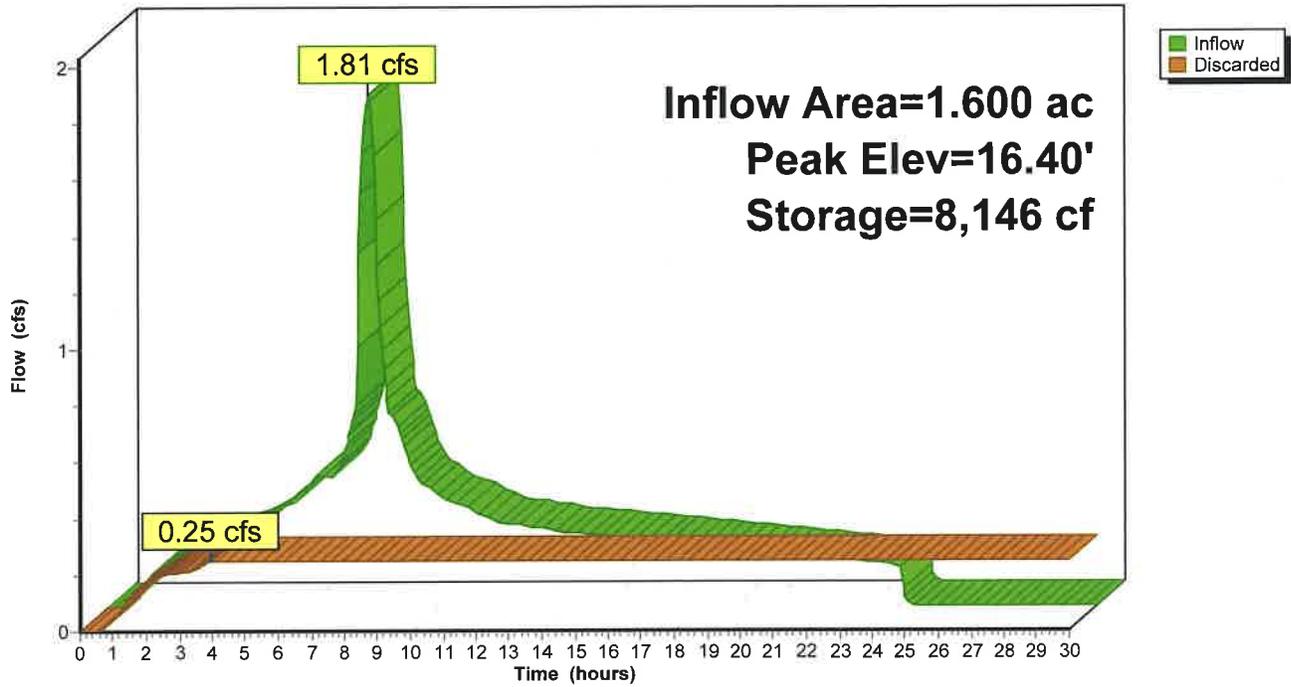
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	5.00'D x 20.00'H Drywell Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	393 cf	5.00'D x 20.00'H Drywell Inside #3 565 cf Overall - 6.0" Wall Thickness = 393 cf
#3	0.00'	9,148 cf	24.00'W x 50.00'L x 20.00'H Prismatic 24,000 cf Overall - 1,131 cf Embedded = 22,869 cf x 40.0% Voids
		9,933 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	9.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.25 cfs @ 3.95 hrs HW=0.20' (Free Discharge)
 ↖ **1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Pond 26P: Chambers

Hydrograph



A19117.Trojan Storage Happy Valley

Type IA 24-hr 100 yr Rainfall=4.80"

Prepared by {enter your company name here}

Printed 2/25/2020

HydroCAD® 10.00-24 s/n 01638 © 2018 HydroCAD Software Solutions LLC

Page 11

Summary for Pond 28P: Chambers

Inflow Area = 1.006 ac, 100.00% Impervious, Inflow Depth = 4.56" for 100 yr event
 Inflow = 1.14 cfs @ 7.90 hrs, Volume= 0.382 af
 Outflow = 0.15 cfs @ 3.80 hrs, Volume= 0.351 af, Atten= 87%, Lag= 0.0 min
 Discarded = 0.15 cfs @ 3.80 hrs, Volume= 0.351 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.05 hrs
 Peak Elev= 18.29' @ 16.15 hrs Surf.Area= 720 sf Storage= 5,421 cf

Plug-Flow detention time= 356.9 min calculated for 0.351 af (92% of inflow)
 Center-of-Mass det. time= 295.6 min (952.3 - 656.7)

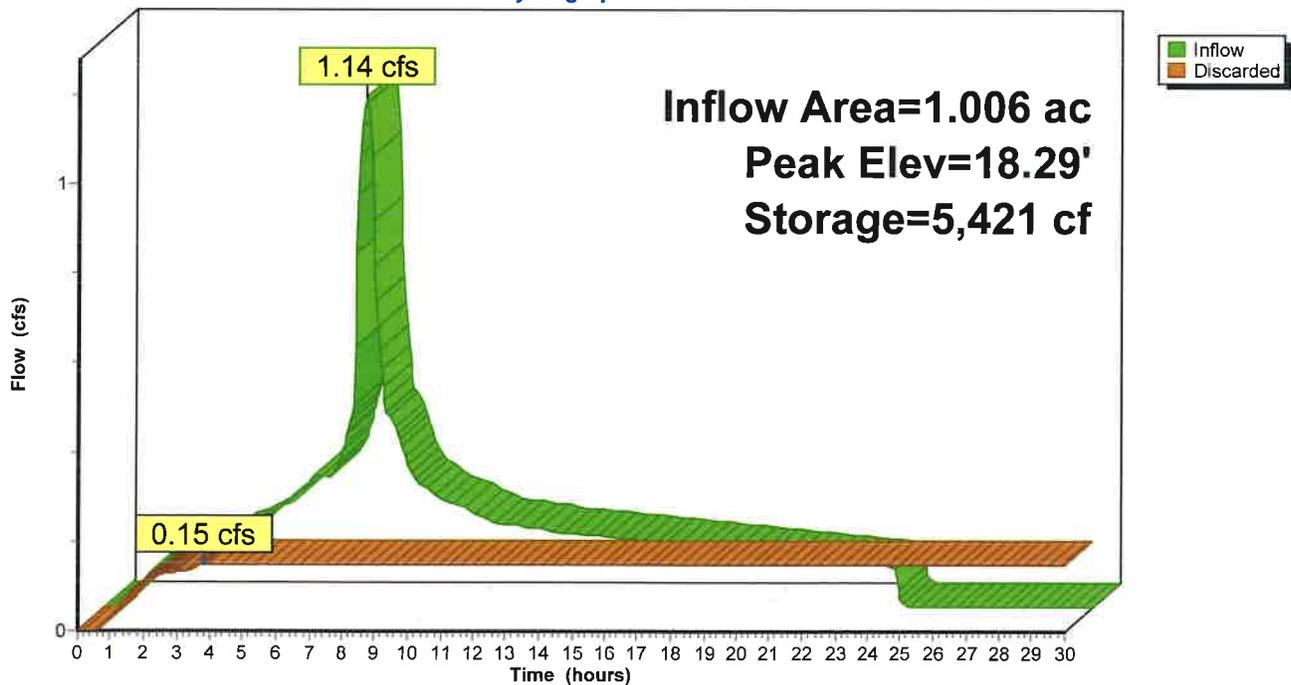
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	393 cf	5.00'D x 20.00'H Drywell Inside #2 565 cf Overall - 6.0" Wall Thickness = 393 cf
#2	0.00'	5,534 cf	20.00'W x 36.00'L x 20.00'H Prismaoid 14,400 cf Overall - 565 cf Embedded = 13,835 cf x 40.0% Voids
		5,927 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Discarded	0.00'	9.000 in/hr Exfiltration over Surface area

Discarded OutFlow Max=0.15 cfs @ 3.80 hrs HW=0.20' (Free Discharge)
 ↳ **1=Exfiltration** (Exfiltration Controls 0.15 cfs)

Pond 28P: Chambers

Hydrograph



Trojan Storage Happy Valley

Appendix E

Geotechnical Report

(See attached report)

August 5, 2019

Trojan Storage
1732 Aviation Boulevard, Suite 217
Redondo Beach, CA 90278

Attention: Maggie Xu

Report of Geotechnical Engineering Services
New Self-Storage Facility
SE 82nd Avenue and SE Glencoe Road
Clackamas, Oregon
GeoDesign Project: TrojanStor-3-01

GeoDesign, Inc. is pleased to present this report of geotechnical engineering services for the proposed Trojan self-storage facility located northwest of the intersection of SE 82nd Avenue and SE Glencoe Road in Clackamas, Oregon. Our services have been provided in accordance with our proposal dated April 26, 2019.

We appreciate the opportunity to be of service to you. Please contact us if you have questions regarding this report.

Sincerely,

GeoDesign, Inc.



Brett A. Shipton, P.E., G.E.
Principal Engineer

SPM:BAS:kt

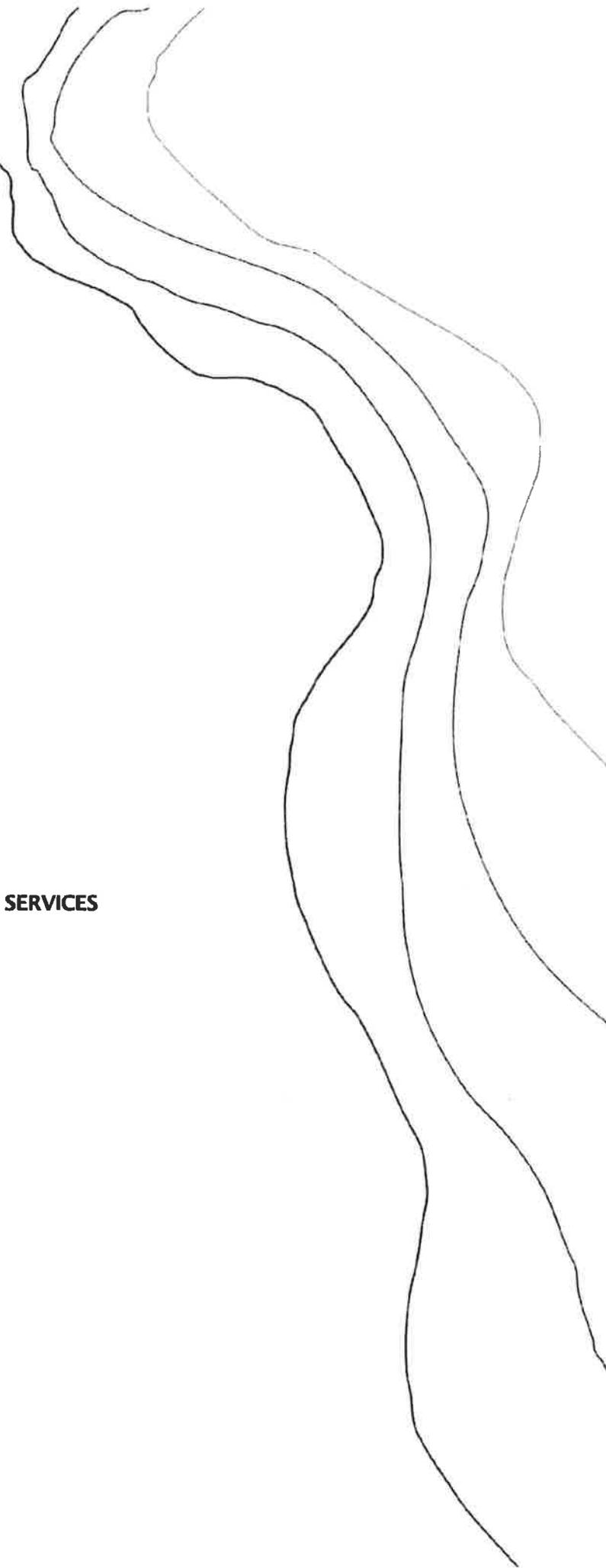
Attachments

One copy submitted (via email only)

Document ID: TrojanStor-3-01-080519-geor.docx

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GEODESIGN^{INC}



REPORT OF GEOTECHNICAL ENGINEERING SERVICES

New Self-Storage Facility
SE 82nd Avenue and SE Glencoe Road
Clackamas, Oregon

For
Trojan Storage
August 5, 2019

GeoDesign Project: TrojanStor-3-01

EXECUTIVE SUMMARY

We understand that development will likely consist of constructing several one- to three-story storage buildings. Paved drive aisles and parking areas will be constructed around the buildings. The buildings will likely be established on mat foundations. The following provides a summary of pertinent geotechnical considerations. The report should be referenced for a more thorough description of the subsurface conditions and geotechnical recommendations.

- Subsurface conditions at the site consist of gravel soil with varying proportions of silt and sand. Minor amounts of cobbles were encountered at depths generally greater than 5 feet BGS. It is possible that boulders exist in the gravel soil, but were not encountered by our borings.
- Historical aerial photographs indicate that the site was once occupied by eight buildings and was used for car and truck parking. The buildings have all been demolished. Any remaining buried foundations should be removed from within planned building areas.
- We observed five different stockpiles of material from building demolition on the site at the time of exploration. The piles appear to consist mostly of concrete fragments and crushed AC and range from approximately 2 to 15 feet tall. Construction debris should be completely removed from planned development areas.
- Areas of undocumented fill and buried construction debris may exist on site. If basements existed in the old structures, they may have been loosely filled with construction debris. This material should be completely removed from below planned buildings. Undocumented fill soil should be improved within planned pavement areas by scarifying and recompacting or replacing with imported structural fill.
- Based on the results of our field explorations and analyses, the proposed structures can be supported on conventional shallow footings or mat foundations bearing on the native gravel soil or at least 12 inches of compacted crushed rock placed over undisturbed native gravel soil. In areas where exposed subgrade does not consist predominantly of gravel, we recommend that the material be removed to a depth of at least 12 inches below the foundation bearing surface and replaced with compacted crushed rock.
- Field testing indicates that the native gravel soil has moderate infiltration capacity at the tested depth of 5 feet BGS in the northeast corner of the site.
- The near-surface soil present at the site has a relatively high silt content and is easily disturbed during the wet season. If not carefully executed, site earthwork can create soft areas and moderate repair costs can result. Subgrade protection may include placing 12 to 18 inches of granular material over subgrade for staging and haul road areas.
- The silty gravel soil near the ground surface can be sensitive to small changes in moisture content and difficult, if not impossible, to adequately compact during wet weather or when the moisture content of the soil is more than a couple of percent above the optimum required for compaction. Depending on the time of year, drying may be required before using silty gravel soil as structural fill. Accordingly, the on-site silty gravel soil can typically only be placed as structural fill during dry summer months.

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ACRONYMS AND ABBREVIATIONS

AASHTO	American Association of State Highway and Transportation Officials
AC	asphalt concrete
ACP	Asphalt Concrete Pavement
ASCE	American Society of Civil Engineers
ASTM	American Society for Testing and Materials
BGS	below ground surface
ESAL	equivalent single-axle load
g	gravitational acceleration (32.2 feet/second ²)
H:V	horizontal to vertical
MCE	maximum considered earthquake
OSHA	Occupational Safety and Health Administration
OSSC	Oregon Standard Specifications for Construction (2018)
PCC	portland cement concrete
pcf	pounds per cubic foot
pci	pounds per cubic inch
PG	performance grade
psf	pounds per square foot
psi	pounds per square inch
SPT	standard penetration test
µm	micrometer

1.0 INTRODUCTION

GeoDesign, Inc. is pleased to present this report of geotechnical engineering services for the proposed Trojan self-storage facility located northwest of the intersection of SE 82nd Avenue and SE Glencoe Road in Clackamas, Oregon. Figure 1 shows the site relative to existing physical features and streets. Figure 2 shows the approximate exploration locations relative to proposed improvements. Acronyms and abbreviations used herein are defined above, immediately following the Table of Contents.

1.1 PROJECT UNDERSTANDING

We understand that development will likely consist of constructing several one- to three-story storage buildings. Paved drive aisles and parking areas will be constructed around the buildings. The buildings will likely be established on mat foundations. The mat foundations are expected to have a maximum distributed dead load of approximately 350 psf and a live load of approximately 125 psf. Based on existing site grades, we anticipate that site cuts and fills will generally be less than 3 feet. On-site stormwater disposal is being considered for this project.

2.0 PURPOSE AND SCOPE

The purpose of our services was to evaluate subsurface conditions and provide geotechnical engineering recommendations for design and construction of the proposed project. Our specific scope for this project included the following:

- Reviewed readily available, published geologic data and our in-house files for existing information on subsurface conditions in the site vicinity.
- Coordinated and managed the field exploration, including locating utilities, coordination with site management, and scheduling subcontractors.
- Conducted a subsurface exploration program that consisted of drilling five borings (B-1 through B-5) to depths of up to 21.5 feet BGS.
- Performed infiltration testing in one of the borings to assist in design of on-site stormwater disposal facilities.
- Maintained continuous logs of the explorations and collected samples at representative intervals.
- Conducted the following laboratory testing program:
 - Fourteen moisture content determinations in general accordance with ASTM D2216
 - Seven particle-size analyses in general accordance with ASTM C117 or ASTM D1140
- Provided recommendations for site preparation and grading, including temporary and permanent slopes, fill placement criteria, suitability of on-site soil for fill, and subgrade preparation.
- Provided recommendations for wet weather construction.
- Provided foundation support recommendations for the proposed buildings, including allowable bearing capacity, settlement estimates, and lateral resistance parameters.
- Provided seismic design parameters in accordance with ASCE 7-10 and ASCE 7-16.
- Provided recommendations for use in design of conventional retaining walls, including backfill and drainage requirements and lateral earth pressures.
- Evaluated groundwater conditions at the site.

- Provided the results of our field infiltration testing and general recommendations for on-site stormwater disposal.
- Prepared this geotechnical engineering report that presents our findings, conclusions, and recommendations.

3.0 SITE CONDITIONS

3.1 GEOLOGIC SETTING

The site is situated west of the drainage valley of Mount Scott Creek, near the south-facing slope of Mount Scott and the north-facing slope of Mount Talbert. Both Mount Scott and Mount Talbert are reported to be volcanic centers with distinct volcanic flows and deposits (Madin, 2004). For the purpose of this report, we will refer to the volcanic units as belonging to the Boring Lava. Based on our review of published geologic data, the near-surface geologic unit underlying the area is mapped as volcanic flows of the late Pliocene to early Pleistocene Age (5 million to 1.5 million years before present) Boring Lava. The Boring Lava consists of a variety of materials that include interstratified layers of highly vesicular and dense basalt flows, basalt flow breccia, and tuff (Schlicker and Finlayson, 1979; Madin, 1990; and Madin, 2004).

A review of water well logs in the area on file with the Oregon Water Resources Department indicates the thickness of the Boring Lava flows is estimated to be in excess of 235 feet in the site vicinity. Based on the well logs, the surficial soil in the site vicinity is a mixture of unconsolidated sand, gravel, silt, and clay with cobbles and boulders representing colluvium deposits or residual soil overlying volcanic bedrock flows. The thickness of the soil in the site vicinity is reported to range from 22 to 59 feet.

The Boring Lava is underlain by the Pliocene to Pleistocene Age (5 million to 1.5 million years before present) Troutdale Formation, which consists of poorly to moderately consolidated, subrounded to rounded sand and gravel. The Troutdale Formation is underlain by the Sandy River Mudstone, which consists of laminated silty clay, micaceous sand, siltstone, and claystone. Bedrock beneath the site is mapped as flows of the Columbia River Basalt Group (Schlicker and Finlayson, 1979; Madin, 1990; and Madin, 2004).

3.2 SURFACE CONDITIONS

The site is currently a vacant lot bound by SE 82nd Avenue to the east, SE Glencoe Road to the south, a residential development to the west, and a retail development to the north. Historical aerial photographs indicate that the site was once occupied by eight buildings and was used for car and truck parking. The buildings have all been demolished, but AC pavement still covers portions of the ground surface.

We observed five different stockpiles of material on the site at the time of exploration. Three of the piles consisted of concrete fragments, one consisted of crushed AC, and one was covered by blackberries, which prevented observation of the material. The stockpiles generally range from 2 to 8 feet tall. The stockpile that was covered by blackberries was estimated to be up to 15 feet tall. We observed an approximately 10-foot-deep depression in one area of the site where a building was once located. Other than the stockpiles and depression, the ground surface is generally flat.

3.3 SUBSURFACE CONDITIONS

3.3.1 General

We explored the subsurface conditions by drilling five borings (B-1 through B-5) to depths of up to 21.5 feet BGS. The exploration locations are shown on Figure 2. Descriptions of our field exploration and laboratory testing programs, the exploration logs, and laboratory test results are presented in the Appendix.

Based on the results of our explorations, the subsurface conditions at the site consist of gravel soil with varying proportions of silt and sand. The gravel particles are generally subrounded to subangular. Minor amounts of cobbles were encountered at depths generally greater than 5 feet BGS in four of the five borings. During exploration, the driller noted that the drill augers may have occasionally encountered the sides of boulders. The top 3 to 4 feet of soil in boring B-4 was classified as silty sand with small amounts of gravel, although it likely represents a portion of this soil unit where the gravel content is lower.

SPT results indicate that the gravel soil is generally loose to medium dense in the upper 5 to 10 feet and medium dense to very dense at greater depths. Laboratory testing indicated moisture contents between 6 and 18 percent at the time of our explorations. Fines contents in select samples ranged from 12 to 35 percent in the gravel soil and was 49 percent in the silty sand soil.

We encountered approximately 4 inches of AC over 8 inches of aggregate base in areas where AC pavement exists.

3.3.2 Groundwater

Groundwater was not encountered in any of our borings. The depth to groundwater may fluctuate in response to prolonged rainfall, seasonal changes, changes in surface topography, and other factors not observed during this study.

3.4 INFILTRATION TESTING

We understand that on-site infiltration is being considered for stormwater disposal. Infiltration testing was performed in boring B-3 at a depth of 5 feet BGS to assist in design/evaluation of disposal facilities. After filling the drill auger with water, we allowed the on-site soil to saturate for an hour. After the soak period, the test was run by measuring the drop in water level over three consecutive test periods. The results of the third period are summarized in Table 1.

Table 1. Infiltration Test Results

Location	Depth (feet BGS)	Soil Type at Test Depth	Measured Infiltration Rate (inches per hour)	Fines Content ¹ (percent)
B-3	5	Gravel with silt and sand	18	12

1. particles finer than 75 μ m by dry weight

4.0 DESIGN RECOMMENDATIONS

4.1 SEISMIC CONSIDERATIONS

Tables 2 and 3 present seismic design parameters prescribed by ASCE 7-10 and ASCE 7-16 based on a selected Site Class D. The appropriate table should be used based on the adopted building code at the time of permitting. Our site class selection is based on SPT results from the borings.

Table 2. ASCE 7-10 Seismic Design Parameters

Parameter	Short Period ($T_s = 0.2$ second)	1 Second Period ($T_1 = 1.0$ second)
MCE Spectral Acceleration, S	$S_s = 0.968$ g	$S_1 = 0.410$ g
Site Class	D	
Site Coefficient, F	$F_a = 1.113$	$F_v = 1.590$
Adjusted Spectral Acceleration, S_M	$S_{MS} = 1.077$ g	$S_{M1} = 0.652$ g
Design Spectral Response Acceleration Parameters, S_D	$S_{DS} = 0.718$ g	$S_{D1} = 0.436$ g

Table 3. ASCE 7-16 Seismic Design Parameters

Parameter	Short Period ($T_s = 0.2$ second)	1 Second Period ($T_1 = 1.0$ second)
MCE Spectral Acceleration, S	$S_s = 0.886$ g	$S_1 = 0.385$ g
Site Class	D	
Site Coefficient, F	$F_a = 1.146$	$F_v = 2.000^*$
Adjusted Spectral Acceleration, S_M	$S_{MS} = 1.015$ g	$S_{M1} = 0.770$ g
Design Spectral Response Acceleration Parameters, S_D	$S_{DS} = 0.676$ g	$S_{D1} = 0.513$ g

* ASCE 7-16 requires that a site-specific ground motion analysis is required for Site Class D, unless the site meets the exception criteria presented in Section 11.4.8. We have provided an F_v value that can be used if this project meets the exception criteria.

Based on the results of our explorations and anticipated groundwater depth, there is a low risk of liquefaction at the site during the design earthquake.

4.2 FOUNDATION SUPPORT

4.2.1 General

Based on the results of our explorations and analysis, the proposed buildings can be supported by conventional shallow footings or a mat foundation bearing on undisturbed native gravel soil or at least 12 inches of compacted crushed rock placed over undisturbed native gravel soil. In areas where exposed subgrade does not consist predominantly of gravel, we recommend that the material be removed to a depth of at least 12 inches below the foundation bearing surface and replaced with compacted crushed rock. We anticipate that areas of undocumented fill will be encountered during foundation excavation, which may include construction debris. If basements existed in the old structures, they may have been loosely filled with construction debris.

We recommend that undocumented fill be completely removed from below the buildings and replaced with crushed rock. Removal should extend 6 inches beyond the footing perimeter for every foot depth of removal. The project budget should include a contingency for removal of some undocumented fill. The crushed rock should be placed and compacted in accordance with the "Structural Fill" section.

Continuous wall and isolated spread footings should be at least 16 and 20 inches wide, respectively. The bottom of exterior column or continuous footings should be at least 18 inches below the lowest adjacent exterior grade. The bottom of interior footings should be established at least 12 inches below the base of the slab.

4.2.2 Bearing Capacity

Column and continuous footings established on undisturbed native soil, or structural fill over undisturbed native soil, and prepared as recommended should be sized based on an allowable bearing pressure of 3,000 psf. The weight of the footing and overlying backfill can be ignored in calculating footing sizes. The recommended allowable bearing pressure applies to the total of dead plus long-term live loads and can be increased by one-half for short-term loads, such as those resulting from wind or seismic forces.

4.2.3 Settlement

Based on our analysis and experience with similar soil, total post-construction consolidation-induced settlement under static conditions should be less than 1 inch, with differential settlement of less than ½ inch between footings.

4.2.4 Resistance to Sliding

Lateral loads on foundations can be resisted by passive earth pressure on the sides of the structure and by friction on the base of the foundation. Our analysis indicates that the available passive earth pressure for footings confined by on-site soil and structural fill is 350 pcf, modeled as an equivalent fluid pressure. Adjacent floor slabs, pavement, or the upper 12-inch depth of adjacent, unpaved areas should not be considered when calculating passive resistance. In addition, in order to rely on passive resistance, a minimum of 10 feet of horizontal clearance must exist between the face of the footings and any adjacent downslopes.

For foundations in contact with native gravel soil or compacted crushed rock, a coefficient of friction equal to 0.4 should be used when calculating resistance to sliding.

4.2.5 Mat Foundations

Mat foundations can be used to support columns and walls under the planned structural loads. Mats should be founded on subgrade prepared as described in the "Construction" section. Based on the foundation loads in the "Project Understanding" section, the maximum distributed contact pressure of the structures will be approximately 350 psf. We estimate that post-construction consolidation-induced settlement of the mat foundation will be less than 1 inch. A subgrade reaction modulus of 200 pci can be used to design the mat if it bears on the native gravel soil or at least 12 inches of compacted crushed rock. This value is intended to estimate deflection on a 1 foot by 1 foot loaded area. The actual subgrade reaction modulus used for design will change based on the actual loaded area. Determining the appropriate subgrade reaction modulus value is typically an iterative process between the structural engineer and the geotechnical engineer. The project structural engineer should contact us to help estimate modulus values across the mats once initial structural design has been completed.

Lateral loads can be resisted by passive earth pressure on the sides of the mat foundations and by friction on the bearing surface. The values for passive pressure and friction recommended in the "Resistance to Sliding" section are applicable for mat foundations.

A 6-inch-thick crushed rock leveling course should be placed between the subgrade and the mat foundation and should meet the requirements for aggregate base rock, as described in the "Structural Fill" section. The material should be placed in one lift and compacted to not less than 95 percent of the maximum dry density, as determined by ASTM D1557.

4.2.6 Foundation Subgrade Evaluation

We recommend all foundation and floor slab subgrades be evaluated by the project geotechnical engineer or their representative to confirm suitable bearing conditions and determine if unsuitable subgrade exists. Observations should be made prior to the placement of any fill or reinforcing soil and to confirm that all loose or soft material, organic matter, undocumented fill, prior topsoil zones, and softened subgrades (if present) have been removed. Foundation-bearing surfaces should not be exposed to standing water. Should water infiltrate and pool in the excavation, the water and any damaged subgrade should be removed before placing reinforcing steel or concrete.

4.3 FLOOR SLABS

Satisfactory subgrade support for building floor slabs not intended to be mat foundations and supporting floor loads up to 150 psf is achievable provided the subgrade is prepared in accordance with this report. We recommend a minimum 6-inch-thick layer of aggregate base be placed and compacted over the prepared soil subgrade. Imported granular material placed beneath building floor slabs should meet the requirements in the "Aggregate Base Rock" and "Fill Placement and Compaction" sections. A subgrade reaction modulus of 150 pci should be used to design slabs that bear on prepared subgrade and at least 6 inches of crushed rock. This value can be increased to 200 pci if the slab is established on at least 12 inches of crushed rock over prepared subgrade.

The near-surface native soil contains some silt and will tend to maintain high moisture content. In areas where moisture-sensitive floor slab and flooring will be installed, the installation of a

vapor barrier is warranted in order to reduce the potential for moisture transmission through and efflorescence growth on the slab and flooring. In addition, flooring manufacturers often require vapor barriers to protect flooring and flooring adhesives and will warrant their product only if a vapor barrier is installed according to their recommendations.

4.4 INFILTRATION SYSTEMS

We understand stormwater will likely be infiltrated on site. Due to site constraints, we assume drywells will be the most effective method for stormwater disposal. Infiltration systems can be designed using the rate shown in Table 1. It is important to note that the on-site soil generally contains higher silt contents at depths from 0 to 5 feet BGS. Our testing was performed at a depth of approximately 5 feet BGS in the northeast corner of the site. We recommend that the infiltration surface be located at least 5 feet below current ground elevation and that infiltration facilities generally be located in the vicinity of our testing (boring B-3).

The infiltration rate shown in Table 1 is a short-term field rate and factors of safety have not been applied for the type of infiltration system being considered. Appropriate correction factors should be applied by the project civil engineer to determine long-term infiltration parameters. Without additional testing, from a geotechnical perspective, we recommend a minimum factor of safety of at least 3 be applied to the field infiltration values presented above to account for soil variability with depth. The infiltration system design engineer should determine and apply appropriate remaining correction factor values or factors of safety to account for degree of in-system filtration, system maintenance, vegetation, potential for siltation, etc.

The infiltration flow rate of a disposal system will diminish over time as suspended solids and precipitates in the stormwater slowly clog the void spaces between the soil particles. Eventually the system may fail and need to be replaced. We recommend the system include an overflow that is connected to a suitable discharge point such as the storm sewer. Finally, stormwater infiltration systems will cause localized high groundwater levels; therefore, they should not be located near basement walls, retaining walls, or other embedded structures unless these are specifically designed to account for the resulting hydrostatic pressure. The stormwater system should not be located on sloping ground unless it is approved by a geotechnical engineer.

It is possible that isolated pockets of low-permeable soil or perched groundwater exist within the design infiltration zone. Therefore, we recommend that drywells be field tested to confirm the design infiltration capacity has been achieved.

4.5 RETAINING STRUCTURES

4.5.1 Assumptions

Our retaining wall design recommendations are based on the following assumptions: (1) the walls consist of conventional, cantilevered retaining walls, (2) the walls are less than 8 feet in height, (3) the backfill is drained and consists of imported granular materials, and (4) the backfill has a slope flatter than 4H:1V. Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project varies from these assumptions.

4.5.2 Wall Design Parameters

For unrestrained retaining walls, an active equivalent fluid pressure of 35 pcf should be used for design. Where retaining walls are restrained from rotation (such as basement walls), an equivalent fluid pressure of 55 pcf should be used for design. A superimposed seismic lateral force should be calculated based on a dynamic force of $7H^2$ pounds per lineal foot of wall (where H is the height of the wall in feet) and applied as a distributed load with the centroid located at a distance of 0.6H from the base of the wall.

If surcharges (e.g., retained slopes, structure foundations, vehicles, steep slopes, terraced walls, etc.) are located within a horizontal distance from the back of a wall equal to the height of the wall, additional pressures will need to be accounted for in the wall design. Our office should be contacted for appropriate wall surcharges based on the actual magnitude and configuration of the applied loads. The base of the wall footing excavations should extend a minimum of 12 inches below the lowest adjacent grade. The wall footings should be designed in accordance with the "Foundation Support" section.

4.5.3 Wall Drainage and Backfill

The above design parameters have been provided assuming back-of-wall drains will be installed to prevent buildup of hydrostatic pressures behind all walls. If a drainage system is not installed, our office should be contacted for revised design forces.

Backfill material placed behind retaining walls and extending a horizontal distance of $\frac{1}{2}H$ (where H is the height of the retaining wall) should consist of select granular wall backfill meeting the requirements described in the "Structural Fill" section. Alternatively, the native soil can be used as backfill material, provided a minimum 1-foot-wide column of angular drain rock wrapped in a geotextile is placed against the wall and the native soil can be adequately moisture conditioned for compaction. The rock column should extend from the perforated drainpipe to within approximately 1 foot of the ground surface. The angular drain rock should meet the requirements provided in the "Structural Fill" section. All wall backfill should be placed and compacted as recommended for select granular wall backfill in the "Structural Fill" section.

Perforated collector pipes should be placed at the base of the granular backfill behind the walls. The pipe should be embedded in a minimum 1-foot-wide zone of angular drain rock. The drain rock should meet specifications provided in the "Structural Fill" section. The drain rock should be wrapped in a drainage geotextile fabric meeting the requirements in the "Materials" section. The collector pipes should discharge at an appropriate location away from the base of the wall. Unless measures are taken to prevent backflow into the drainage system of the wall, the discharge pipe should not be tied directly into stormwater drain systems.

Settlement of up to 1 percent of the wall height commonly occurs immediately adjacent to the wall as the wall rotates and develops active lateral earth pressures. Consequently, we recommend that construction of flatwork adjacent to retaining walls be postponed at least four weeks after backfilling of the wall, unless survey data indicates that settlement is complete prior to that time.

4.6 PAVEMENT DESIGN

Pavement should be installed on prepared subgrade or new engineered fill prepared in conformance with the "Construction" section. Subgrade improvement may be necessary in some areas where soft material or undocumented fill is present, as discussed in the "Subgrade Evaluation" section. Our pavement recommendations are based on the following assumptions:

- The top 12 inches of soil subgrade below the pavement section is compacted to at least 95 percent of its maximum density, per ASTM D1557, or observations indicate that it is in a firm, unyielding condition.
- Resilient moduli of 4,500 psi and 20,000 psi were estimated for the subgrade and aggregate base, respectively.
- Initial and terminal serviceability indices of 4.2 and 2.5, respectively.
- Reliability of 75 percent and standard deviation of 0.45.
- Structural coefficients of 0.42 and 0.10 for the AC and aggregate base, respectively.
- A 20-year design life.
- Heavy traffic generally consists of two-axle trucks, such as U-Haul trucks and garbage trucks.

We do not have specific information on the frequency of vehicles expected at the site. We completed pavement design for several assumed traffic scenarios. We understand that the site will likely be paved with PCC. For PCC pavement, we recommend a minimum section of 6 inches of PCC over 6 inches of aggregate base. This section is suitable up to at least 42,000 ESALs, which corresponds to approximately 300 passenger vehicles per day and 20 trucks per day (two axles). We assumed a minimum compressive strength of 4,000 psi for the PCC.

If needed, assumed traffic breakdown and recommended AC pavement sections are provided in Table 4. The design team can select the appropriate pavement section for different areas of the site based on the anticipated traffic levels. All of the recommended pavement sections with subgrades prepared as recommended are suitable to support an occasional 80,000-pound fire truck.

Table 4. Minimum Pavement Thicknesses

Traffic Levels		Pavement Thicknesses ¹ (inches)		
Cars per Day	Trucks per Day	ESAL	AC	Aggregate Base ²
300	0	3,000	2.5	6.0
300	5	13,949	3.0	6.0
300	10	22,306	3.5	6.0
300	20	42,686	3.5	8.0

1. All thicknesses are intended to be the minimum acceptable values.
2. Aggregate base may need to be increase to 12 to 18 inches if construction occurs during wet season.

The AC, PCC, and aggregate base should meet the requirements outlined in the "Materials" section. Construction traffic should be limited to non-building, unpaved portions of the site or

haul roads. Construction traffic should not be allowed on new pavement. If construction traffic is to be allowed on newly constructed road sections, an allowance for this additional traffic will need to be made in the design pavement section. The aggregate base thickness does not account for construction traffic, and haul roads and staging areas should be used as described in the "Construction" section. The aggregate base section may need to be increased if construction traffic will operate in planned pavement areas during wet weather.

4.7 DRAINAGE

Where possible, the finished ground surface around the buildings should be sloped away from the structures at a minimum 2 percent gradient for a distance of at least 5 feet. Downspouts or roof scuppers should discharge into a storm drain system that carries the collected water to an appropriate stormwater system. Trapped planter areas should not be created adjacent to the buildings without providing means for positive drainage (e.g., swales or catch basins). Embedded walls should include drainage, as discussed in the "Retaining Structures" section.

4.8 PERMANENT SLOPES

Permanent cut and fill slopes should not exceed 2H:1V. Slopes within stormwater facilities should not exceed 3H:1V. Access roads and pavement should be located at least 5 feet from the top of cut and fill slopes. The setback should be increased to 10 feet for buildings. The slopes should be planted with appropriate vegetation to provide protection against erosion as soon as possible after grading. Surface water runoff should be collected and directed away from slopes to prevent water from running down the face of the slope.

5.0 CONSTRUCTION

5.1 SITE PREPARATION

5.1.1 Demolition

Demolition should include complete removal of existing structures and pavement within 5 feet of areas to receive new pavement, buildings, retaining walls, or engineered fills. Underground utility lines, vaults, or tanks encountered in areas of new improvements should be completely removed or grouted full if left in place. It is possible that basements existed with the former structures. Any construction debris placed in abandoned basements should be replaced with structural fill if located in development areas. The site contains numerous stockpiles of construction debris, which should be completely removed from the site. In some areas, construction debris may be present below the existing ground surface. The explorations generally encountered 4 inches of AC over 8 inches of aggregate base in pavement areas. Aggregate base underlying AC does not need to be removed.

Old basement/crawlspace areas or voids resulting from removal of improvements or loose soil in utility lines should be backfilled with compacted structural fill, as discussed in the "Structural Fill" section. The bottom of such excavations should be excavated to expose a firm subgrade before filling and their sides sloped at a minimum of 1H:1V to allow for more uniform compaction at the edges of the excavations.

Material generated during demolition should be transported off site for disposal or stockpiled in areas designated by the owner. In general, this material will not be suitable for re-use as engineered fill. It may be possible to use AC grindings as a subbase material for new pavement. GeoDesign can provide additional recommendations upon request.

5.1.2 Subgrade Evaluation

Upon completion of demolition and site cutting and prior to the placement of fill and structures/pavements, the exposed subgrade should be evaluated by proof rolling. The subgrade should be proof rolled with a fully loaded dump truck or similarly heavy, rubber tire construction equipment to identify soft, loose, or unsuitable areas. A member of our geotechnical staff should observe proof rolling to evaluate yielding of the ground surface. During wet weather, subgrade evaluation should be performed by probing with a foundation probe rather than proof rolling.

Areas containing undocumented fill or soft soil should be improved by scarifying and re-compacting (dry weather only) or replacing with imported granular material in accordance with the "Structural Fill" and "Fill Placement and Compaction" sections. Scarifying and re-compacting native soil may require that the soil be dried and only be possible during the dry summer months. We recommend the project budget include a contingency for removal of unsuitable subgrade in isolated areas and replacement with structural fill. As discussed in the "Demolition" section, construction debris should be completely removed from below planned foundations, slabs, and pavement.

5.2 SUBGRADE PROTECTION

The near-surface soil is silty and is easily disturbed when wet. If not carefully executed, site preparation, utility trench work, and roadway excavation can create extensive soft areas and significant repair costs can result. Earthwork planning, regardless of the time of year, should include considerations for minimizing subgrade disturbance.

If construction occurs during the wet season, or if the moisture content of the surficial soil is more than a couple percentage points above optimum, site stripping and cutting may need to be accomplished using track-mounted equipment. Likewise, the use of granular haul roads and staging areas will be necessary for support of construction traffic during the rainy season or when the moisture content of the surficial soil is more than a few percentage points above optimum. The base rock thickness for pavement areas is intended to support post-construction design traffic loads and may not support construction traffic or paving equipment when the subgrade soil is wet. Accordingly, if construction is planned for periods when the subgrade soil is wet, staging and haul roads with increased thicknesses of base rock will be required.

The size of staging and haul road areas, as well as the required thickness of granular material, will vary with the contractor's sequencing of a project and exposure to construction equipment. Based on our experience, between 12 and 18 inches of imported granular material is generally required in staging areas and between 18 and 24 inches in haul roads areas. Stabilization material may be used as a substitute, provided the top 4 inches of material consists of imported granular material. The actual thickness will depend on the contractor's means and methods and, accordingly, should be the contractor's responsibility. In addition, a geotextile fabric can be

placed as a barrier between the subgrade and imported granular material in areas of repeated construction traffic, such as site entrances. The imported granular material, stabilization material, and geotextile fabric should meet the specifications in the "Materials" section.

As an alternative to thickened crushed rock sections, subgrade is often cement amended to provide wet weather protection from construction traffic. However, the near-surface soil may contain too much gravel to be successfully cement treated. A qualified cement amendment contractor can be consulted to determine if it is feasible. GeoDesign can provide cement amendment recommendations upon request.

5.3 EXCAVATION

Excavation in the on-site soil should generally be possible with conventional earthwork equipment. The gravel soil may be prone to sloughing and caving when excavated at inclinations greater than 1H:1V.

5.3.1 Trenches and Shoring

Temporary excavation sidewalls in the on-site soil should stand near vertical to a depth of 4 feet. Open excavation techniques may be used to excavate trenches with depths between 4 and 8 feet, provided the walls of the excavation are cut at a slope of 1H:1V and groundwater seepage is not present. In lieu of large and open cuts, approved temporary shoring may be used for excavation support. A wide variety of shoring and dewatering systems are available. Consequently, we recommend that the contractor be responsible for selecting the appropriate shoring and dewatering systems.

If box shoring is used, it should be understood that box shoring is a safety feature used to protect workers and does not prevent caving. If excavations are left open for extended periods of time, caving of the sidewalls may occur. The presence of caved material will limit the ability to properly backfill and compact the trenches. The contractor should be prepared to fill voids between the box shoring and the sidewalls of the trenches with sand or gravel before caving occurs.

If shoring is used, we recommend that the type and design of the shoring system be the responsibility of the contractor, who is in the best position to choose a system that fits the overall plan of operation. All excavations should be made in accordance with applicable OSHA and state regulations.

5.3.2 Temporary Dewatering

Shallow excavations are not expected to encounter the regional groundwater table, although some perched water may be encountered. If perched groundwater is encountered, it should be possible to remove it by pumping from sumps.

5.3.3 Safety

All excavations should be made in accordance with applicable OSHA requirements and regulations of the state, county, and local jurisdiction. While this report describes certain approaches to excavation and dewatering, the contract documents should specify that the

contractor is responsible for selecting excavation and dewatering methods, monitoring the excavations for safety, and providing shoring (as required) to protect personnel and adjacent structural elements.

5.4 MATERIALS

5.4.1 Structural Fill

5.4.1.1 General

Fill should be placed on subgrade that has been prepared in conformance with the "Site Preparation" section. A variety of material may be used as structural fill at the site. However, all material used as structural fill should be free of organic matter or other unsuitable material and should meet the specifications provided in OSSC 00330 (Earthwork), OSSC 00400 (Drainage and Sewers), and OSSC 02600 (Aggregates), depending on the application. A brief characterization of some of the acceptable materials and our recommendations for their use as structural fill is provided below. Fill should be compacted as described in the "Fill Placement and Compaction" section.

5.4.1.2 On-Site Soil

The on-site material should be suitable for use as general structural fill, provided it is properly moisture conditioned; free of debris, organic matter, and particles over 6 inches in diameter; and meets the specifications provided in OSSC 00330.12 (Borrow Material). Laboratory testing indicates that the on-site soil was near optimum moisture content at the time of exploration. However, moisture conditioning (drying) will be required to use on-site soil for structural fill after periods of wet weather. The on-site soil will be difficult, if not impossible, to use as structural fill during the wet season, typically from October through June.

5.4.1.3 Imported Granular Material

Imported granular material used as structural fill should be pit- or quarry-run rock, crushed rock, or crushed gravel and sand and should meet the specifications provided in OSSC 00330.14 (Selected Granular Backfill) or OSSC 00330.15 (Selected Stone Backfill). The imported granular material should also be angular, should be fairly well graded between coarse and fine material, should have less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve, and should have at least two fractured faces.

5.4.1.4 Stabilization Material

Stabilization material used in staging or haul road areas, in trenches, or for other applications should consist of 4- or 6-inch-minus pit- or quarry-run rock, crushed rock, or crushed gravel and sand and should meet the specifications provided in OSSC 00330.15 (Selected Stone Backfill). The material should have a maximum particle size of 6 inches, should have less than 5 percent by dry weight passing the U.S. Standard No. 4 sieve, and should have at least two mechanically fractured faces. The material should be free of organic matter and other deleterious material. Stabilization material should be placed in lifts between 12 and 24 inches thick and compacted to a firm condition.

5.4.1.5 Trench Backfill

Trench backfill placed beneath, adjacent to, and for at least 12 inches above utility lines (i.e., the pipe zone) should consist of well-graded granular material with a maximum particle size of

1½ inches and less than 10 percent by dry weight passing the U.S. Standard No. 200 sieve and should meet the specifications provided in OSSC 00405.13 (Pipe Zone Material). Within roadway alignments, the remainder of the trench backfill up to the subgrade elevation should consist of well-graded granular material with a maximum particle size of 2½ inches and less than 10 percent by dry weight passing the U.S. Standard No. 200 sieve and should meet the specifications provided in OSSC 00405.14 (Trench Backfill; Class B, C, or D).

Outside of structural improvement areas (e.g., roadway alignments or building pads) trench backfill placed above the pipe zone may consist of general fill material that is free of organic matter and material over 6 inches in diameter and meets the specifications provided in OSSC 00405.14 Trench Backfill; Class A, B, C, or D).

5.4.1.6 Drain Rock

Drain rock should consist of angular, granular material with a maximum particle size of 2 inches and should meet the specifications provided in OSSC 00430.11 (Granular Drain Backfill Material). The material should be free of roots, organic matter, and other unsuitable material; should have less than 2 percent by dry weight passing the U.S. Standard No. 200 sieve (washed analysis); and should have at least two mechanically fractured faces. Drain rock should be compacted to a well-keyed, firm condition.

5.4.1.7 Aggregate Base Rock

Imported granular material used as base rock for building floor slabs and pavement should consist of ¾- or 1½-inch-minus material (depending on the application) and meet the requirements in OSSC 00641 (Aggregate Subbase, Base, and Shoulders). Aggregate should have at least two mechanically fractured faces. In addition, the aggregate should have less than 5 percent by dry weight passing the U.S. Standard No. 200 sieve.

5.4.1.8 Retaining Wall Select Backfill

Backfill material placed behind retaining walls and extending a horizontal distance of ½H, where H is the height of the retaining wall, should consist of select granular material that meets the specifications provided in OSSC 00510.12 (Granular Wall Backfill) or OSSC 00510.13 (Granular Structure Backfill). We recommend the select granular wall backfill be separated from general fill, native soil, and/or topsoil using a geotextile fabric that meets the specifications provided below for drainage geotextiles.

The backfill should be placed and compacted as recommended for structural fill, with the exception of backfill placed immediately adjacent to walls. Backfill adjacent to walls should be compacted to a lesser standard to reduce the potential for generation of excessive pressure on the walls.

5.4.2 Geotextile Fabric

5.4.2.1 Subgrade Geotextile

Subgrade geotextile should conform to OSSC Table 02320-1 and OSSC 00350 (Geosynthetic Installation). A minimum initial aggregate base lift of 6 inches is required over geotextiles.

5.4.2.2 Drainage Geotextile

Drainage geotextile should conform to Type 2 material of OSSC Table 02320-1 and OSSC 00350 (Geosynthetic Installation). A minimum initial aggregate base lift of 6 inches is required over geotextiles.

5.4.3 AC

5.4.3.1 ACP

The AC should be Level 2, ½-inch, dense ACP according to OSSC 00744 (Asphalt Concrete Pavement – Statistical Acceptance) and compacted to 91 percent of the maximum specific gravity, as determined by AASHTO T 209. The minimum and maximum lift thickness is 2.0 and 3.5 inches, respectively, for ½-inch ACP. Asphalt binder should be performance graded and conform to PG 64-22.

5.4.3.2 Cold Weather Paving Considerations

In general, AC paving is not recommended during the cold weather (temperatures less than 40 degrees Fahrenheit). Compacting under these conditions can result in low compaction and premature pavement distress.

Each AC mix design has a recommended compaction temperature range that is specific for the particular AC binder used. In colder temperatures, it is more difficult to maintain the temperature of the AC mix as it can lose heat while stored in the delivery truck, as it is placed, and in the time between placement and compaction. In Oregon, the AC surface temperature during paving should be at least 40 degrees Fahrenheit for lift thickness greater than 2.5 inches and at least 50 degrees Fahrenheit for lift thickness between 2.0 and 2.5 inches. If paving activities must take place during cold-weather construction as defined above, the project team should be consulted and a site meeting should be held to discuss ways to lessen low compaction risks.

5.4.3.3 PCC

PCC should be "Class 4000 1 ½" paving concrete as listed in OSSC 00756 (Plain Concrete Pavement). Joints, if used, should be placed at 12 feet on-center.

5.5 FILL PLACEMENT AND COMPACTION

Fill soil should be compacted at a moisture content that is within 3 percent of optimum. The maximum allowable moisture content varies with the soil gradation and should be evaluated during construction. Fill and backfill material should be placed in uniform, horizontal lifts and compacted with appropriate equipment. The maximum lift thickness will vary depending on the material and compaction equipment used but should generally not exceed the loose thicknesses provided in Table 5. Fill material should be compacted in accordance with the compaction criteria provided in Table 6.

Table 5. Recommended Uncompacted Lift Thickness

Compaction Equipment	Recommended Uncompacted Lift Thickness (inches)		
	Silty/Clayey Soil	Granular and Crushed Rock Maximum Particle Size ≤ 1½ Inches	Crushed Rock Maximum Particle Size > 1½ Inches
Hand Tools: Plate Compactor and Jumping Jack	4 to 8	4 to 8	Not Recommended
Rubber Tire Equipment	6 to 8	10 to 12	6 to 8
Light Roller	8 to 10	10 to 12	8 to 10
Heavy Roller	10 to 12	12 to 18	12 to 16
Hoe Pack Equipment	12 to 16	18 to 24	18 to 24

The table above is based on our experience and is intended to serve only as a guideline. The information provided in this table should not be included in the project specifications.

Table 6. Compaction Criteria

Fill Type	Compaction Requirements in Structural Zones		
	Percent Maximum Dry Density Determined by ASTM D1557		
	0 to 2 feet Below Subgrade (percent)	Greater Than 2 feet Below Subgrade (percent)	Pipe Zone (percent)
Area Fill (Granular)	95	95	-----
Area Fill (Fine Grained)	92	92	-----
Aggregate Bases	95	95	-----
Trench Backfill ^{1,2}	95	92	90 ^{1,2}
Retaining Wall Backfill	95 ³	92 ³	-----

1. Trench backfill above the pipe zone in non-structural areas should be compacted to 85 percent.
2. Or as recommended by the pipe manufacturer.
3. Should be reduced to 90 percent within a horizontal distance of 3 feet from the retaining wall.

5.6 EROSION CONTROL

The fine-grained soil at this site is eroded easily by wind and water; therefore, erosion control measures should be carefully planned and in place before construction begins. Measures that can be employed to reduce erosion include the use of silt fences, hay bales, buffer zones of natural growth, sedimentation ponds, and granular haul roads. All erosion control methods should be in accordance with local jurisdiction standards. During earthwork at the site, the contractor should be responsible for temporary drainage of surface water as necessary to prevent standing water and/or erosion at the working surface.

6.0 OBSERVATION OF CONSTRUCTION

Satisfactory earthwork and foundation performance depend to a large degree on the quality of construction. Subsurface conditions observed during construction should be compared with those encountered during the subsurface explorations. Recognition of changed conditions often requires experience; therefore, qualified personnel should visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those anticipated. In addition, sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications.

7.0 LIMITATIONS

We have prepared this report for use by Trojan Storage and members of their design and construction teams for the proposed project. The data and report can be used for estimating purposes, but our report, conclusions, and interpretations should not be construed as a warranty of the subsurface conditions and are not applicable to other sites.

Soil explorations indicate soil conditions only at specific locations and only to the depths penetrated. The soil explorations do not necessarily reflect soil strata or water level variations that may exist between exploration locations. If subsurface conditions differing from those described are noted during the course of excavation and construction, re-evaluation will be necessary. In addition, if design changes are made, we should be retained to review our conclusions and recommendations and to provide a written evaluation or modification.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Within the limitations of scope, schedule, and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty or other conditions, express or implied, should be understood.

◆ ◆ ◆

We appreciate the opportunity to be of continued service to you. Please call if you have questions concerning this report or if we can provide additional services.

Sincerely,

GeoDesign, Inc.



Scott McDevitt, P.E., G.E.
Senior Project Engineer



Brett A. Shipton, P.E., G.E.
Principal Engineer



REFERENCES

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Madin, Ian P., 2004, Geologic Mapping and Database for Portland Area Fault Studies, Oregon Department of Geology and Mineral Industries, Open-File Report O-04-2, Digital CD.

Schlicker, Herbert G. and Finlayson, Christopher T., 1979, Geology and Geologic Hazards of Northwestern Clackamas County, Oregon, Oregon Department of Geology and Mineral Industries Bulletin 99, 79p.

FIGURES

Printed By: mmiller , Print Date: 8/2/2019 9:22:34 AM
 File Name: J:\S-2\TrojanStor-3\TrojanStor-3-01\Figures\CAD\TrojanStor-3-01-VM01.dwg | Layout: FIGURE 1



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TROJANSTOR-3-01

VICINITY MAP

AUGUST 2019

NEW SELF-STORAGE FACILITY
 CLACKAMAS, OR

FIGURE 1



LEGEND:
 ——— SITE BOUNDARY
 B-1-0 BORING

- NOTES:**
1. SITE PLAN BASED ON IMAGE OF PRELIM. SITE PLAN DATED MAY 24, 2019 PREPARED BY JORDAN ARCHITECTS.
 2. AERIAL PHOTOGRAPH (JULY 16, 2019) OBTAINED FROM GOOGLE EARTH PRO JULY 12, 2019.

 9450 SW Commerce Circle - Suite 300 Wilsonville, OR 97070 503 968 6787 www.geodesigninc.com	TROJANSTOR-3-01	SITE PLAN	
	AUGUST 2019	NEW SELF-STORAGE FACILITY CLACKAMAS, OR	FIGURE 2

APPENDIX

APPENDIX

FIELD EXPLORATIONS

GENERAL

We explored the subsurface conditions at the site by drilling five borings (B-1 through B-5) using hollow-stem auger methods to depths of up to 21.5 feet BGS at the approximate locations shown on Figure 2. Drilling services were provided by Western States Soil Conservation, Inc. of Hubbard, Oregon, on June 13, 2019. The exploration logs are presented in this appendix.

The exploration locations were determined by pacing from existing site features. This information should be considered accurate to the degree implied by the methods used. A member of our geology staff observed the explorations and collected representative samples of the various soils encountered in the explorations for geotechnical laboratory testing.

SOIL SAMPLING

Soil samples were collected from the borings using SPT sampling methods. SPTs were performed in general conformance with ASTM D1586. The sampler was driven with a 140-pound hammer free-falling 30 inches. The number of blows required to drive the sampler 1 foot, or as otherwise indicated, into the soil is shown adjacent to the sample symbols on the exploration logs. Disturbed samples were collected from the split barrel for subsequent classification and index testing. Sampling methods and intervals are shown on the exploration logs.

The average efficiency of the automatic SPT hammer used by Western States Soil Conservation, Inc. was 86.0 percent. The calibration testing results are presented at the end of this appendix.

SOIL CLASSIFICATION

The soil samples were classified in accordance with the "Exploration Key" (Table A-1) and "Soil Classification System" (Table A-2), which are presented in this appendix. The exploration logs indicate the depths at which the soils or their characteristics change, although the change actually could be gradual. If the change occurred between sample locations, the depth was interpreted. Classifications are shown on the exploration logs.

LABORATORY TESTING

CLASSIFICATION

The soil samples were classified in the laboratory to confirm field classifications. The laboratory classifications are shown on the exploration logs if those classifications differed from the field classifications.

MOISTURE CONTENT TESTING

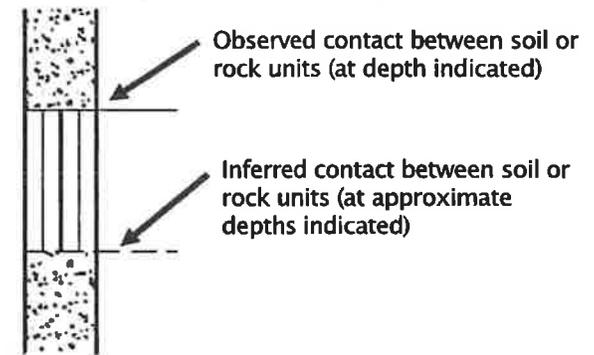
The natural moisture content of select soil samples was determined in general accordance with ASTM D2216. The natural moisture content is a ratio of the weight of the water to soil in a test sample and is expressed as a percentage. The test results are presented in this appendix.

PARTICLE-SIZE ANALYSIS

We completed particle-size analysis on select soil samples in order to determine the particle size distribution. The tests determined percent fines (passing a U.S. Standard No. 200 sieve) in general accordance with ASTM C117 or ASTM D1140. The test results are presented in this appendix.

SYMBOL	SAMPLING DESCRIPTION
	Location of sample collected in general accordance with ASTM D1586 using Standard Penetration Test with recovery
	Location of sample collected using thin-wall Shelby tube or Geoprobe® sampler in general accordance with ASTM D1587 with recovery
	Location of sample collected using Dames & Moore sampler and 300-pound hammer or pushed with recovery
	Location of sample collected using Dames & Moore sampler and 140-pound hammer or pushed with recovery
	Location of sample collected using 3-inch-O.D. California split-spoon sampler and 140-pound hammer with recovery
	Location of grab sample
	Rock coring interval
	Water level during drilling
	Water level taken on date shown

Graphic Log of Soil and Rock Types



GEOTECHNICAL TESTING EXPLANATIONS

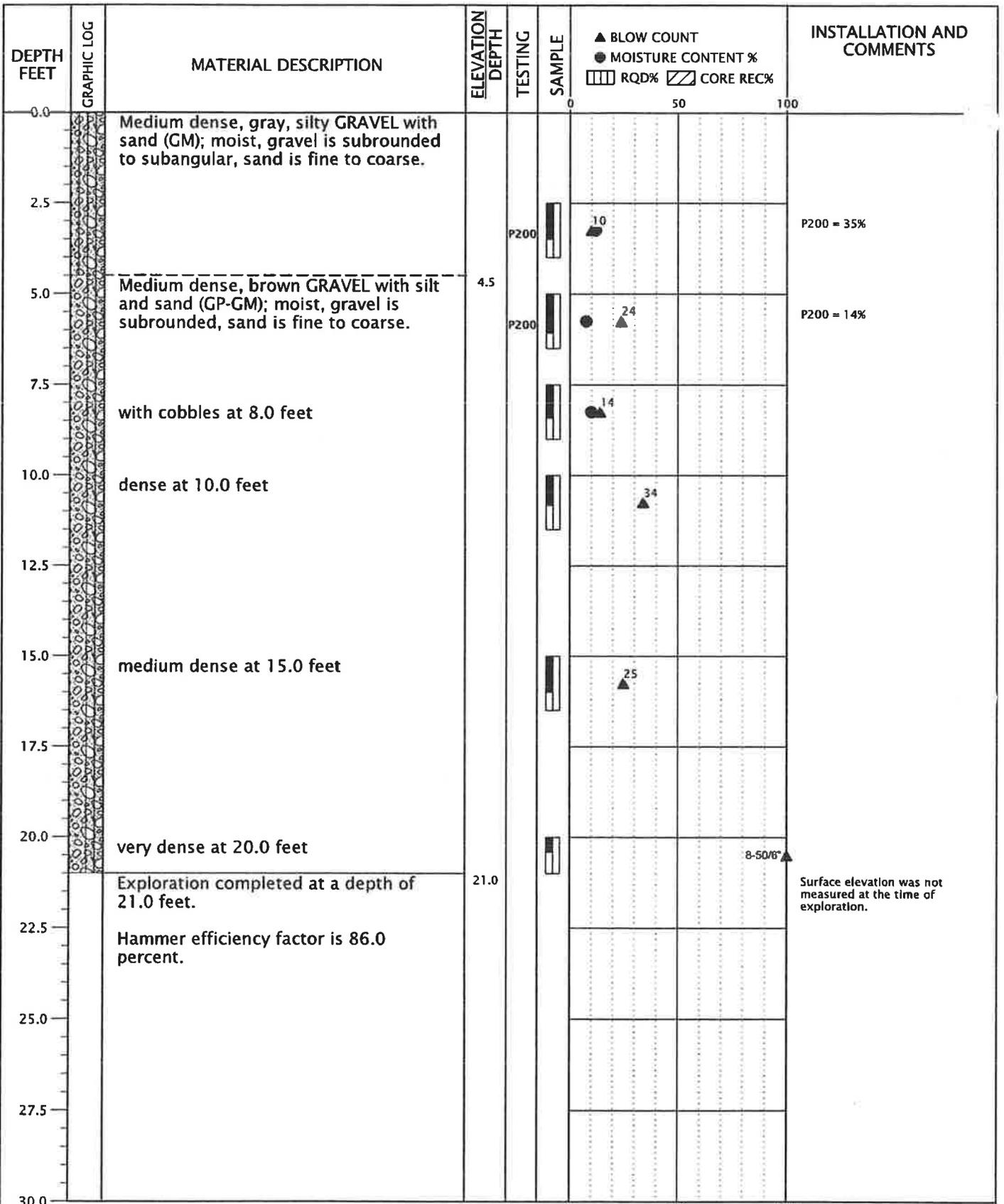
ATT	Atterberg Limits	P	Pushed Sample
CBR	California Bearing Ratio	PP	Pocket Penetrometer
CON	Consolidation	P200	Percent Passing U.S. Standard No. 200 Sieve
DD	Dry Density	RES	Resilient Modulus
DS	Direct Shear	SIEV	Sieve Gradation
HYD	Hydrometer Gradation	TOR	Torvane
MC	Moisture Content	UC	Unconfined Compressive Strength
MD	Moisture-Density Relationship	VS	Vane Shear
NP	Non-Plastic	kPa	Kilopascal
OC	Organic Content		

ENVIRONMENTAL TESTING EXPLANATIONS

CA	Sample Submitted for Chemical Analysis	ND	Not Detected
P	Pushed Sample	NS	No Visible Sheen
PID	Photoionization Detector Headspace Analysis	SS	Slight Sheen
ppm	Parts per Million	MS	Moderate Sheen
		HS	Heavy Sheen

RELATIVE DENSITY - COARSE-GRAINED SOIL									
Relative Density		Standard Penetration Resistance		Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)			
Very Loose		0 - 4		0 - 11		0 - 4			
Loose		4 - 10		11 - 26		4 - 10			
Medium Dense		10 - 30		26 - 74		10 - 30			
Dense		30 - 50		74 - 120		30 - 47			
Very Dense		More than 50		More than 120		More than 47			
CONSISTENCY - FINE-GRAINED SOIL									
Consistency		Standard Penetration Resistance		Dames & Moore Sampler (140-pound hammer)		Dames & Moore Sampler (300-pound hammer)		Unconfined Compressive Strength (tsf)	
Very Soft		Less than 2		Less than 3		Less than 2		Less than 0.25	
Soft		2 - 4		3 - 6		2 - 5		0.25 - 0.50	
Medium Stiff		4 - 8		6 - 12		5 - 9		0.50 - 1.0	
Stiff		8 - 15		12 - 25		9 - 19		1.0 - 2.0	
Very Stiff		15 - 30		25 - 65		19 - 31		2.0 - 4.0	
Hard		More than 30		More than 65		More than 31		More than 4.0	
PRIMARY SOIL DIVISIONS					GROUP SYMBOL		GROUP NAME		
COARSE-GRAINED SOIL (more than 50% retained on No. 200 sieve)	GRAVEL (more than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (< 5% fines)			GW or GP		GRAVEL		
		GRAVEL WITH FINES (\geq 5% and \leq 12% fines)			GW-GM or GP-GM		GRAVEL with silt		
					GW-GC or GP-GC		GRAVEL with clay		
		GRAVEL WITH FINES (> 12% fines)			GM		silty GRAVEL		
					GC		clayey GRAVEL		
	GC-GM				silty, clayey GRAVEL				
	SAND (50% or more of coarse fraction passing No. 4 sieve)	CLEAN SAND (<5% fines)			SW or SP		SAND		
		SAND WITH FINES (\geq 5% and \leq 12% fines)			SW-SM or SP-SM		SAND with silt		
					SW-SC or SP-SC		SAND with clay		
		SAND WITH FINES (> 12% fines)			SM		silty SAND		
SC					clayey SAND				
SC-SM					silty, clayey SAND				
FINE-GRAINED SOIL (50% or more passing No. 200 sieve)	SILT AND CLAY	Liquid limit less than 50			ML		SILT		
					CL		CLAY		
					CL-ML		silty CLAY		
		Liquid limit 50 or greater			OL		ORGANIC SILT or ORGANIC CLAY		
					MH		SILT		
					CH		CLAY		
	OH			ORGANIC SILT or ORGANIC CLAY					
	HIGHLY ORGANIC SOIL					PT		PEAT	
MOISTURE CLASSIFICATION			ADDITIONAL CONSTITUENTS						
Term	Field Test	Secondary granular components or other materials such as organics, man-made debris, etc.							
		Percent	Silt and Clay In:		Percent	Sand and Gravel In:			
	Fine-Grained Soil		Coarse-Grained Soil			Fine-Grained Soil	Coarse-Grained Soil		
dry	very low moisture, dry to touch	< 5	trace	trace	< 5	trace	trace		
moist	damp, without visible moisture	5 - 12	minor	with	5 - 15	minor	minor		
		> 12	some	silty/clayey	15 - 30	with	with		
wet	visible free water, usually saturated				> 30	sandy/gravelly	Indicate %		
 9450 SW Commerce Circle - Suite 300 Wilsonville OR 97070 503.968.8787 www.geodesigninc.com			SOIL CLASSIFICATION SYSTEM				TABLE A-2		

BORING LOG TROJANSTOR-3-01-B1_5.GPJ GEODESIGN.GDT PRINT DATE: 8/2/19:KM:KT



DRILLED BY: Western States Soil Conservation, Inc. LOGGED BY: L. Gose COMPLETED: 06/13/19

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 6.5 inches



TROJANSTOR-3-01
AUGUST 2019

BORING B-1
NEW SELF-STORAGE FACILITY
CLACKMAS, OR

FIGURE A-1

BORING LOG TROJANSTOR-3-01-81_5.GPJ GEODESIGN.GDT PRINT DATE: 8/2/19:KM:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
0.0		Loose, brown, silty GRAVEL with sand (GM); moist, gravel is subrounded, sand is fine to coarse.					
2.5				P200			P200 = 35%
5.0		medium dense at 5.0 feet					
7.5		Medium dense, brown GRAVEL with silt and sand (GP-GM); moist, gravel is subrounded, sand is fine to coarse.	7.0				
10.0							
12.5							
15.0							
17.5							
20.0							
21.5		Exploration completed at a depth of 21.5 feet. Hammer efficiency factor is 86.0 percent.	21.5				Surface elevation was not measured at the time of exploration.
22.5							
25.0							
27.5							
30.0							

DRILLED BY: Western States Soil Conservation, Inc.

LOGGED BY: L. Gose

COMPLETED: 06/13/19

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 6.5 inches

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TROJANSTOR-3-01

BORING B-2

AUGUST 2019

NEW SELF-STORAGE FACILITY
 CLACKMAS, OR

FIGURE A-2

BORING LOG TROJANSTOR-3-01-B1-B1_5.GPJ GEODESIGN.GDT PRINT DATE: 8/2/19:KM:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
0.0		ASPHALT CONCRETE (4.0 inches).					
0.3		AGGREGATE BASE (8.0 inches).					
1.0		Medium dense, brown, silty GRAVEL with sand (GM); moist, gravel is subrounded, sand is fine to coarse.					
2.5							
5.0		Medium dense, brown GRAVEL with silt and sand (GP-GM); moist, gravel is subrounded.		P200		19	P200 = 19%
7.5		dense, with cobbles at 7.5 feet					
10.0		very dense at 10.0 feet					Driller Indicates possible boulders at 10.0 feet.
12.5							
15.0		dense at 15.0 feet					
17.5							
20.0							
21.5		Exploration completed at a depth of 21.5 feet.	21.5				Surface elevation was not measured at the time of exploration.
22.5		Hammer efficiency factor is 86.0 percent.					
25.0							
27.5							
30.0							

DRILLED BY: Western States Soil Conservation, Inc. LOGGED BY: L. Gose COMPLETED: 06/13/19

BORING METHOD: hollow-stem auger (see document text) BORING BIT DIAMETER: 6.5 inches

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TROJANSTOR-3-01
 AUGUST 2019

BORING B-3
 NEW SELF-STORAGE FACILITY
 CLACKMAS, OR

FIGURE A-3

BORING LOG TROJANSTOR-3-01-81_5.GPJ GEODESIGN.GDT PRINT DATE: 8/2/19:KM:KT

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	ELEVATION DEPTH	TESTING	SAMPLE	▲ BLOW COUNT ● MOISTURE CONTENT % ▨ RQD% ▩ CORE REC%	INSTALLATION AND COMMENTS
0.0		ASPHALT CONCRETE (4.0 inches). AGGREGATE BASE (8.0 inches).	0.3 1.0				
2.5		Loose, brown, silty SAND (SM), trace gravel; moist, sand is fine to coarse, gravel is angular.					
5.0		Medium dense, brown GRAVEL with silt and sand (GP-GM); moist, gravel is subrounded, sand is fine to coarse.	4.5				
10.0		dense at 10.0 feet					
15.0		medium dense, with cobbles at 15.0 feet					
20.0		dense at 20.0 feet					
22.5		Exploration completed at a depth of 21.5 feet. Hammer efficiency factor is 86.0 percent.	21.5				Surface elevation was not measured at the time of exploration.

DRILLED BY: Western States Soil Conservation, Inc.

LOGGED BY: L. Gose

COMPLETED: 06/13/19

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 6.5 inches



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TROJANSTOR-3-01

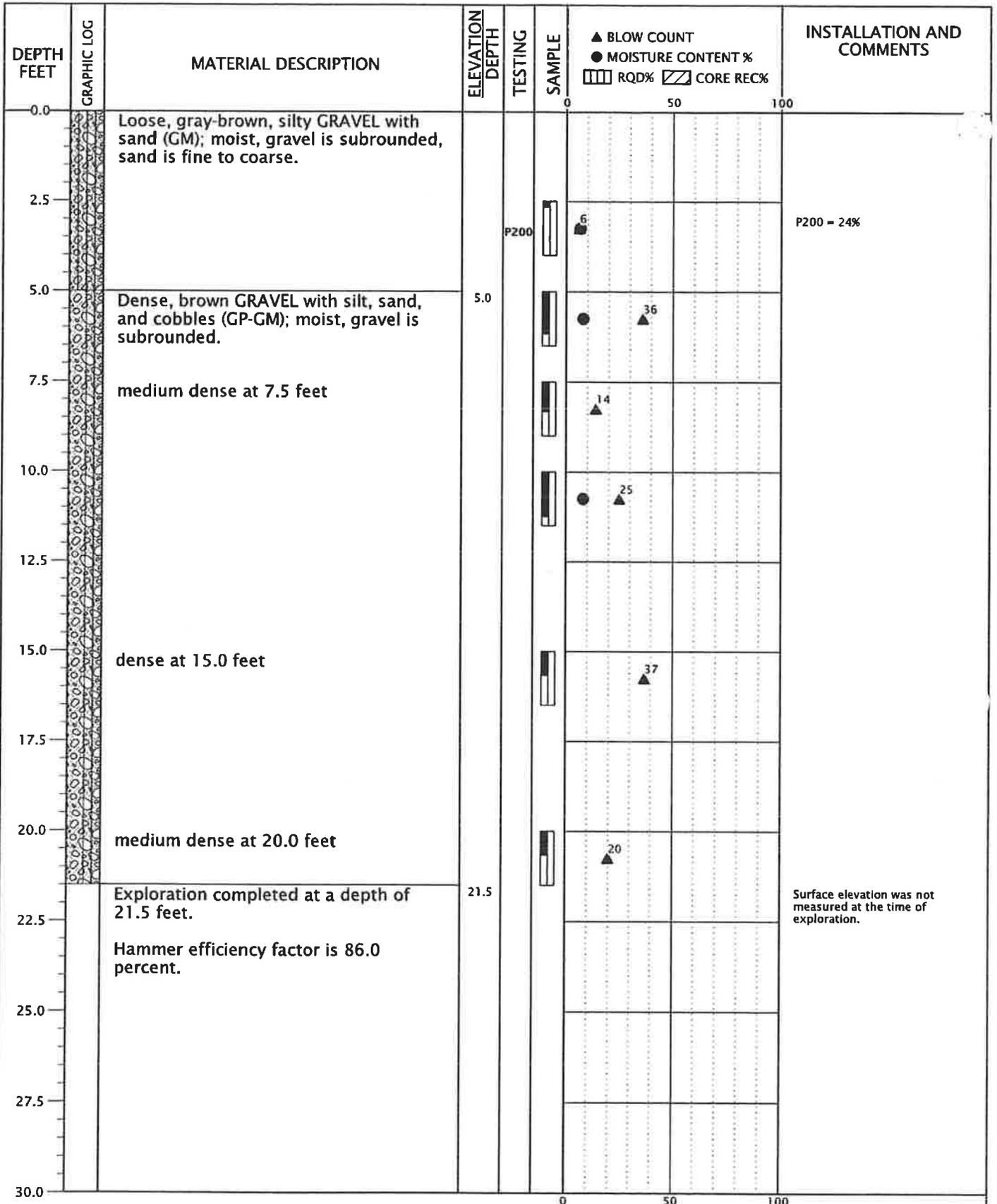
AUGUST 2019

BORING B-4

NEW SELF-STORAGE FACILITY
CLACKMAS, OR

FIGURE A-4

BORING LOG TROJANSTOR-3-01-B1_5.CPJ_GEODESIGN.GDT PRINT DATE: 8/2/19:KM:KT



DRILLED BY: Western States Soil Conservation, Inc.

LOGGED BY: L. Gose

COMPLETED: 06/13/19

BORING METHOD: hollow-stem auger (see document text)

BORING BIT DIAMETER: 6.5 inches



TROJANSTOR-3-01

BORING B-5

AUGUST 2019

NEW SELF-STORAGE FACILITY
CLACKMAS, OR

FIGURE A-5

SAMPLE INFORMATION			MOISTURE CONTENT (PERCENT)	DRY DENSITY (PCF)	SIEVE			ATTERBERG LIMITS		
EXPLORATION NUMBER	SAMPLE DEPTH (FEET)	ELEVATION (FEET)			GRAVEL (PERCENT)	SAND (PERCENT)	P200 (PERCENT)	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX
B-1	2.5		12			35				
B-1	5.0		8			14				
B-1	7.5		10							
B-2	2.5		15			35				
B-2	5.0		10							
B-2	10.0		9							
B-3	2.5		11			19				
B-3	5.0		12			12				
B-3	7.5		7							
B-4	2.5		18			49				
B-4	5.0		9							
B-5	2.5		6			24				
B-5	5.0		8							
B-5	10.0		8							

LAB SUMMARY: TROJANSTOR-3-01-B1_5.GPJ GEODESIGN.GDT PRINT DATE: 8/2/19:KT



TROJANSTOR-3-01

AUGUST 2019

SUMMARY OF LABORATORY DATA

NEW SELF-STORAGE FACILITY
CLACKMAS, OR

FIGURE A-6

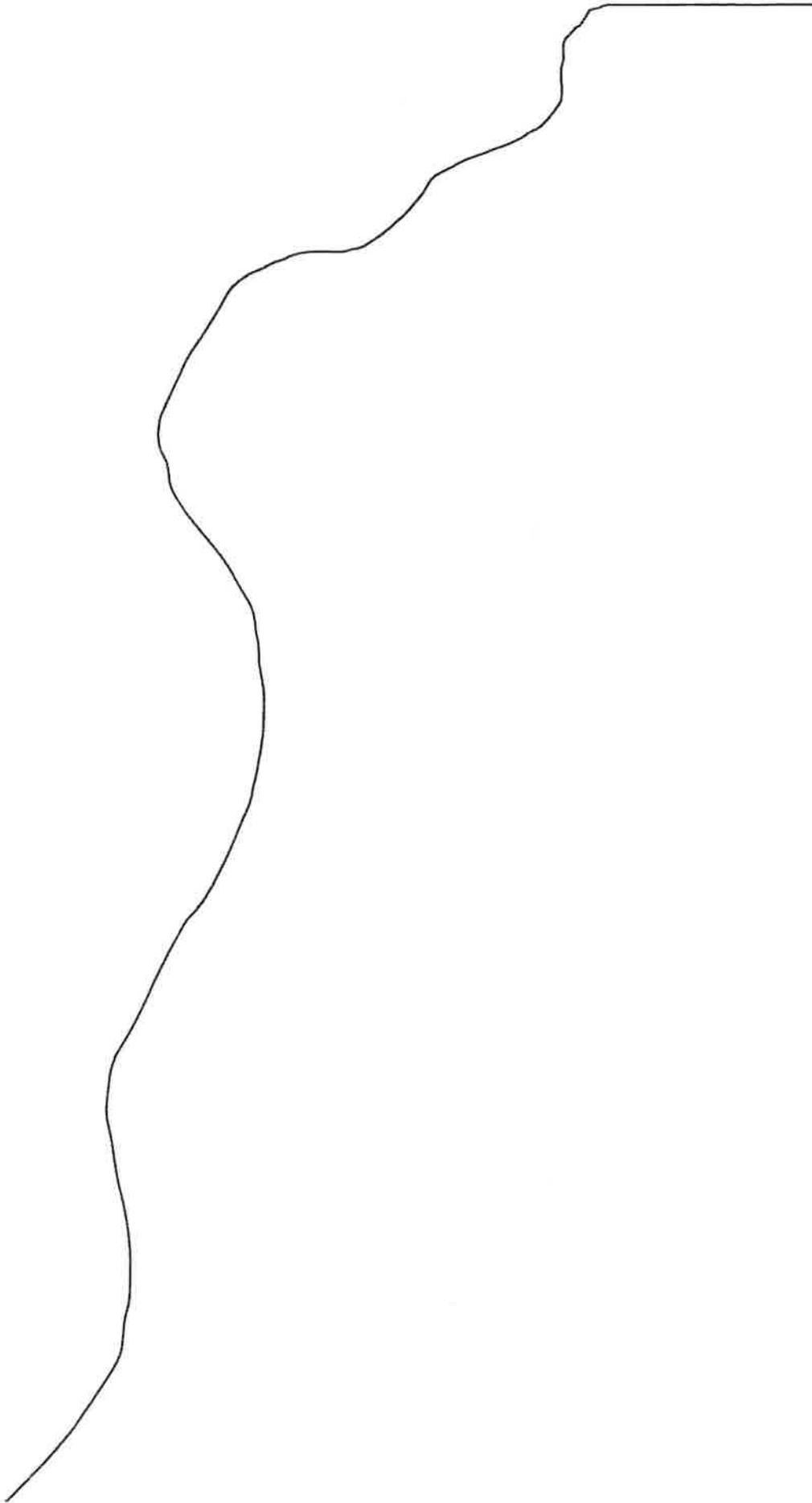
Summary of SPT Test Results

Project: WSSC-8-04, Test Date: 12/27/2018

EMX: Maximum Energy

Start Depth ft	Final Depth ft	N Value	N60 Value	ETR: Energy Transfer Ratio - Rated	
				Average EMX ft-lb	Average ETR %
25.00	26.50	20	28	300.86	86.0
30.00	31.50	0	0	0.00	0.0
35.00	36.50	0	0	0.00	0.0
40.00	41.50	0	0	0.00	0.0

Overall Average Values: 300.86 86.0
 Standard Deviation: 20.24 5.8
 Overall Maximum Value: 342.80 97.9
 Overall Minimum Value: 276.33 79.0



Trojan Storage Happy Valley

Appendix F

Operations and Maintenance Form

(Operations and Maintenance will be provided at permit submittal)